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DOT HS 808 307

August 1995

Final Report

Final Report of a Renaissance Cars Tropica Roadster into Flat Frontal Barrier at 47.6 kph

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15. Supplemental Notes

16. Abstract

A 48 kph flat frontal barrier impact test was conducted on a Renaissance Cars Tropica Roadster at Transportation Research Center Inc. on June 5, 1995. This test was conducted to gather data concerning the application of Federal Motor Vehicle Safety Standard (FMVSS) 208, "Occupant Crash Protection."

The impact velocity was 47.6 kph. The vehicle's maximum static crush was 730 millimeters. The ambient temperature was 23° C.

The driver's Head Injury Criteria (HIC) was 373. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 41.8 g. The driver's chest maximum deflection was 31 mm. The driver's left and right femur maximum axial forces were 2750 N and 793 N, respectively.

The passenger's HIC was 592. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 40.1 g. The passenger's chest maximum deflection was 28 millimeters. The passenger's left and right femur maximum axial forces were 5536 N and 7664 N, respectively.

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METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
		MASS (weight)		
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
		VOLUME		
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
		TEMPERATURE (exact)		
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

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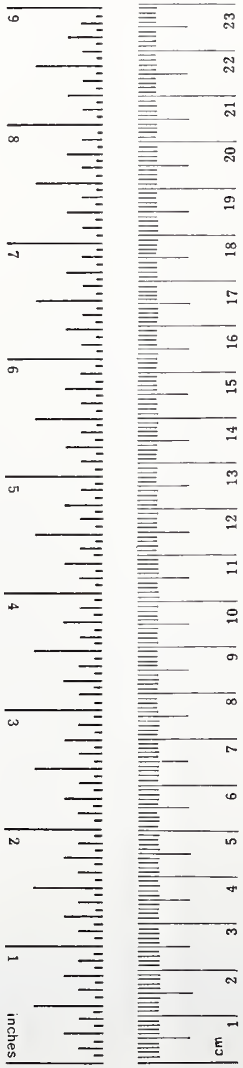
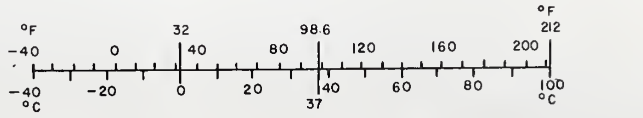
*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286. Units of Weights and Measures, Price $2.25, SD Catalog No. C13.10:286.



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
		AREA		
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10.000 m^2)	2.5	acres	
		MASS (weight)		
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
		VOLUME		
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
		TEMPERATURE (exact)		
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



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Section 1.0

Purpose and Test Procedure

Purpose

This 48 kph flat frontal barrier impact test was conducted for Vehicle Research and Test Center by Transportation Research Center Inc. (TRC). The purpose of this test was to gather data concerning the application of Federal Motor Vehicle Safety Standard FMVSS 208, "Occupant Crash Protection."

Test Procedure

This test was conducted using NHTSA's Office of Vehicle Safety Compliance (OVSC) Laboratory Test Procedure No. TP-208-09 as a guideline with the addition of a post-impact static rollover test to determine if electrolyte leakage occurred into the passenger's compartment or outside the vehicle. Data was obtained relative to FMVSS 208, "Occupant Crash Protection."

The test vehicle was instrumented with nine (9) accelerometers to measure longitudinal and vertical axis accelerations. The vehicle's specified impact velocity range was 46.5 to 48.1 kph. The vehicle impacted a flat frontal barrier.

The test vehicle contained two (2) Part 572 E 50th percentile adult male anthropomorphic test devices (dummies). The dummies were positioned in the front outboard designated seating positions according to the dummy placement procedures specified in Appendix C of the Laboratory Test Procedure.

Both dummies were instrumented with head and chest accelerometers to measure longitudinal, lateral, and vertical accelerations, and with left and right femur load cells to measure axial forces. Each Part 572 E dummy's instrumentation also included a chest potentiometer to measure longitudinal deflection.

The twenty-seven (27) data channels were digitally sampled and recorded at 12,500 samples per second and processed per Sections 11.13 through 11.15 of the Laboratory Test Procedure.

The crash event was recorded by one (1) real-time panning motion picture camera and fourteen (14) high-speed motion picture cameras operating at approximately 1000 frames per second. The pre- and post-test conditions were recorded by one (1) real-time motion picture camera.

The vehicle and occupant data are presented in Section 2.0. The FMVSS 208 data are presented in Section 3.0. The vehicle, occupant, and camera measurements are presented in Section 4.0. Appendix A contains the still photographic prints. Appendix B contains the dummy and vehicle data plots. Appendix C contains the dummy certification data. Appendix D contains miscellaneous test information.

Section 2.0

Frontal Barrier Impact Test Summary

Test Results Summary

This flat frontal barrier test was conducted at TRC on June 5, 1995.

The test vehicle, a Renaissance Cars Tropica Pilot Vehicle No. 1, appeared to comply with the performance requirements of FMVSS 208 in the flat frontal barrier impact mode. The Head Injury Criteria (HIC) calculations were less than 1000, the chest resultant accelerations did not exceed 60 g's, and the axial forces transmitted through the upper legs did not exceed 10,008 N as measured by Part 572 E dummies seated in the front outboard designated seating positions. For each Part 572 E dummy, the chest deflection did not exceed 76 millimeters.

The vehicle's test weight was 1267 kg. The vehicle's impact speed was 47.6 kph. The vehicle sustained 730 millimeters of static crush during the impact.

The driver's HIC was 373. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 41.8 g. The driver's chest maximum deflection was 31 mm. The driver's left and right femur maximum axial forces were 2750 N and 793 N, respectively.

The passenger's HIC was 592. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 40.0 g. The passenger's chest maximum deflection was 28 mm. The passenger's left and right femur maximum axial forces were 5536 N and 7664 N, respectively.

A large amount of electrolyte leaked from the vehicle's front batteries during and immediately following the impact event. 11.3 liters of electrolyte leaked from the vehicle during the static rollover test and electrolyte was found in the passenger's compartment after the static rollover test. The vehicle's front windshield broke loose from the vehicle during the impact event and the driver's seat belt latch anchor also broke during the impact event.

Data Acquisition Explanations

The subject vehicle's front bulkhead center X-axis acceleration data channel, FFCXG1, stopped recording data after approximately 26 milliseconds because the device's cable was cut by vehicle crush.

The subject vehicle's front bulkhead center Z-axis acceleration data channel, FFCZG1, stopped recording data after approximately 51 milliseconds because the device's cable was cut by vehicle crush.

Table 1 Crash Test Summary

Test type:	Flat Frontal Barrier Impact	
Test date:	06/05/95	
Test time:	1338	
Ambient temperature:	23° C	
Vehicle year/make/ model/body style:	NA/Renaissance Cars/Tropica/Roadster	
Vehicle test weight:	1267 kg	
Impact angle[1]:	0°	
Impact velocity[2]:	Primary = 47.6 kph Secondary = 47.6 kph	
Maximum static crush:	730 mm	
Average rebound:	1818 mm	
Dummies:	Driver #083	Passenger #177
Type:	Part 572 E	Part 572 E
Location:	Left front	Right front
Restraint:	3-point unibelt	3-point unibelt
Number of data channels:	9	9
Number of cameras:	High-speed 14 Real-time 1	

---

[1] With respect to tow track centerline.

[2] Speed trap measurement (± .08 kph accuracy)

Table 2 Test Vehicle Information

Vehicle manufactured by:	Renaissance Cars
Vehicle year/make/ model/body style:	NA/Renaissance Cars/Tropica/Roadster
Color:	White
VIN:	Pilot Vehicle No. 1
Electric motor data:	
Placement:	2 rear mounted transverse
Type:	72 volt DC series wound
Final drive:	__fwd, _X_rwd, __4wd
Date vehicle received:	05/31/95
Odometer reading:	NA
Dealer's name and address:	NA

Accessories:

Power steering	No	Automatic transmission	Yes
Power brakes	No	Automatic speed control	No
Power seats	No	Tilting steering wheel	No
Power windows	No	Telescoping steering wheel	No
Tinted glass	Yes	Air conditioning	No
Radio	No	Anti-skid brake	No
Clock	No	Rear window defroster	No
Power door locks	No	Other	None

Certification data from vehicle's label:[1]

Vehicle manufactured by:

Date of manufacture:

VIN:

GVWR:

GAWR: Front:

Rear:

---

[1] Vehicle did not contain a certification label.

Table 2 Test Vehicle Information, Cont'd.

Size of tires: P205/60R15

Spare tire: None

Type of front seats: Non-adjustable bucket

Tire & capacity data from vehicle's label: [1]

Recommended tire size:

Recommended cold tire pressure:
Front:
Rear:

Designated seating capacity:
Front
Rear
Total

Vehicle capacity weight:

Test vehicle attitude:

Delivered attitude: LF 695 mm; RF 706 mm; LR 673 mm; RR 672 mm

Pre-test attitude: LF 700 mm; RF 713 mm; LR 657 mm; RR 653 mm

Tire pressure for test: Front: 220 kPa
Rear: 220 kPa

---

[1] The vehicle did not contain a recommended tire pressure label.

Table 2 Test Vehicle Information, Cont'd

Weight of test vehicle as received (with maximum fluids):

Right front	233	kg	Right rear	274	kg
Left front	251	kg	Left rear	268	kg
Total front weight	484	kg	(47.2% of total vehicle weight)		
Total rear weight	542	kg	(52.3% of total vehicle weight)		
Total delivered weight	1026	kg			

Weight of test vehicle with required dummies and 89 kg of cargo weight:

Right front	251	kg	Right rear	373	kg
Left front	276	kg	Left rear	367	kg
Total front weight	527	kg	(41.6% of total vehicle weight)		
Total rear weight	740	kg	(58.4% of total vehicle weight)		
Total test weight	1267	kg			

Weight of ballast secured in vehicle: None

Components removed to meet target test weight: None

CG rearward of front wheel centerline: 1320 mm

Vehicle wheelbase: 2260 mm

Front overhang: 932 mm

Maximum width: 1877 mm

Table 3 Post-Impact Data

Test number:	950605
Test date:	06/05/95
Test time:	1338
Test type:	Flat frontal barrier impact
Impact angle:	0°
Ambient temperature at impact area:	23° C
Temperature in occupant compartment:	21° C
Impact velocity:	
Primary	47.6 kph
Secondary	47.6 kph
Specified range	46.5 to 48.1 kph
Distance from vehicle to barrier:	
Entering velocity trap	356 mm
Exiting velocity trap	51 mm

Test vehicle static crush:

Overall length of test vehicle:

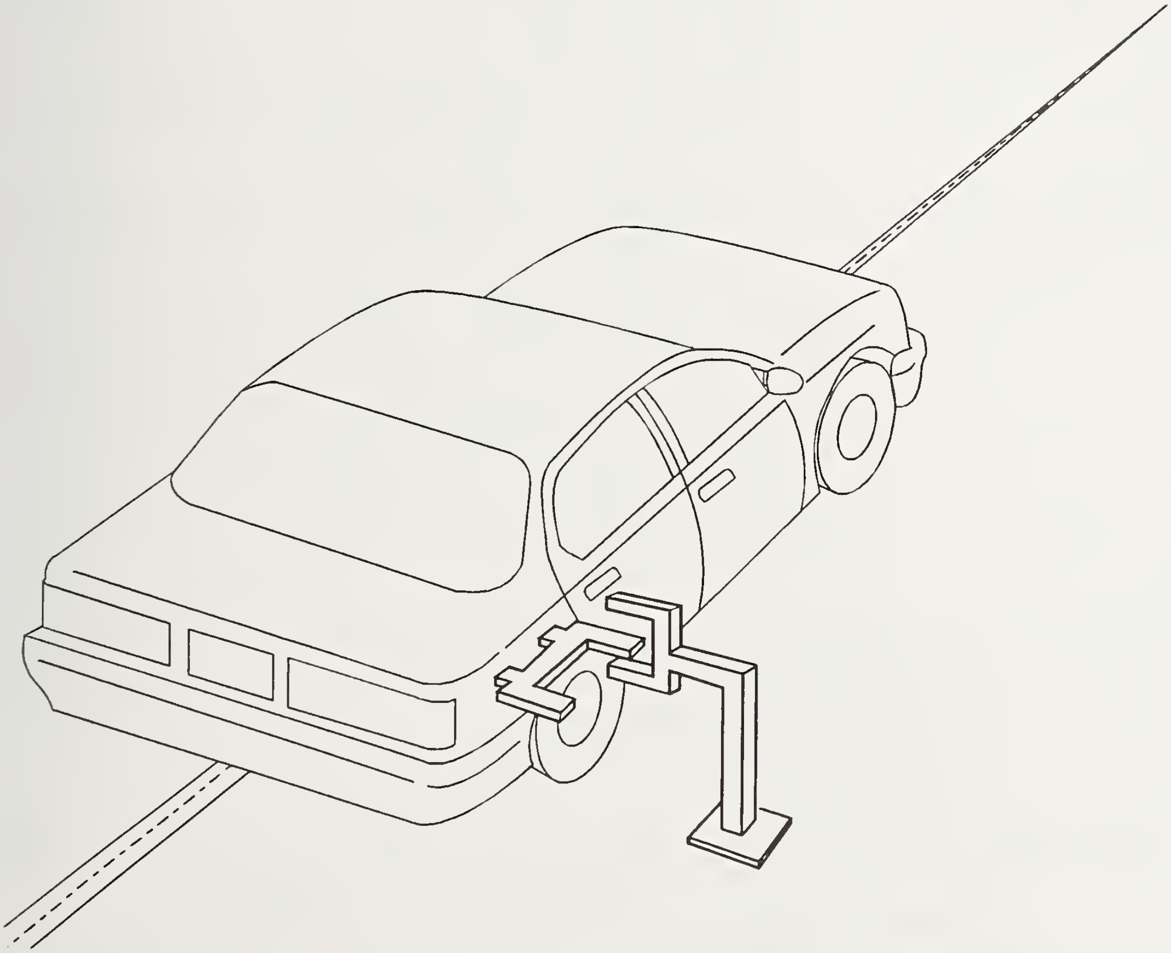
Pre-test:	L	3652 mm;	C	3952 mm;	R	3651 mm
Post-test:	L	3469 mm;	C	3222 mm;	R	NA[1]
Total crush:	L	183 mm;	C	730 mm;	R	NA[1]
Average crush:	413 mm					

Test vehicle rebound from flat barrier:

Distance from test vehicle to barrier: C 1818 mm

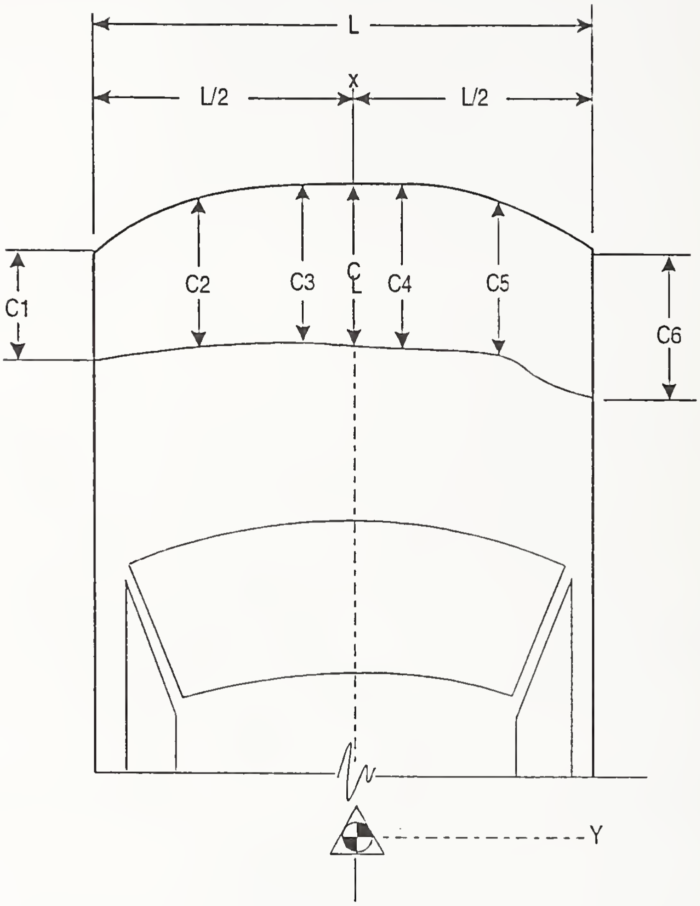
[1] Right side of vehicle's bumper was destroyed during the impact event.

Figure 1 Impact Velocity Measurement System



The final vane clears the final emitter/receiver pair 51 millimeters before impact. The vanes have 305-millimeter spacing.

Figure 2 Vehicle Crush



Notes: L is pre-test length of contact surface.

C1 through C6 are spaced equally apart.

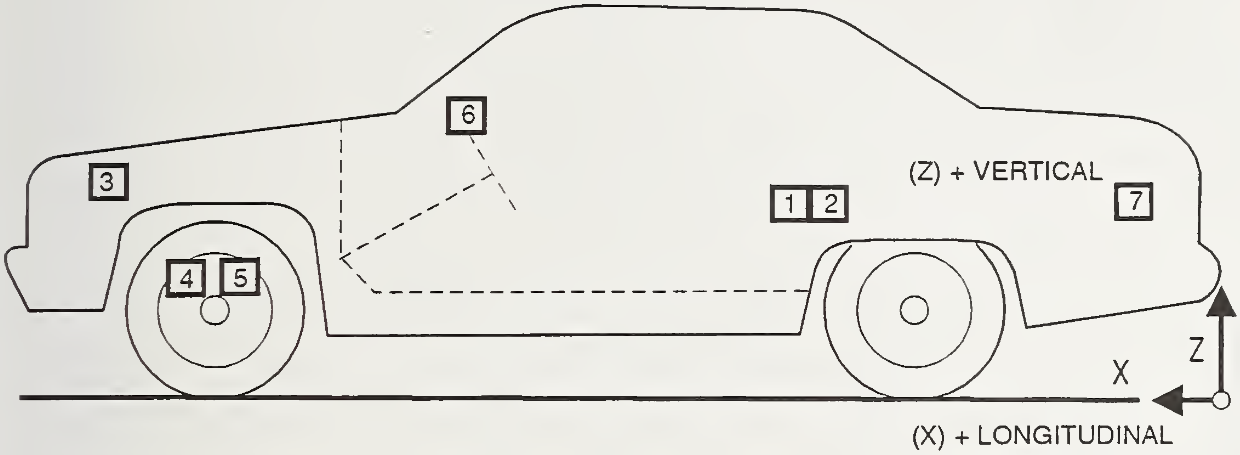
CL is vehicle centerline.

Vehicle: Renaissance Cars Tropica Roadster

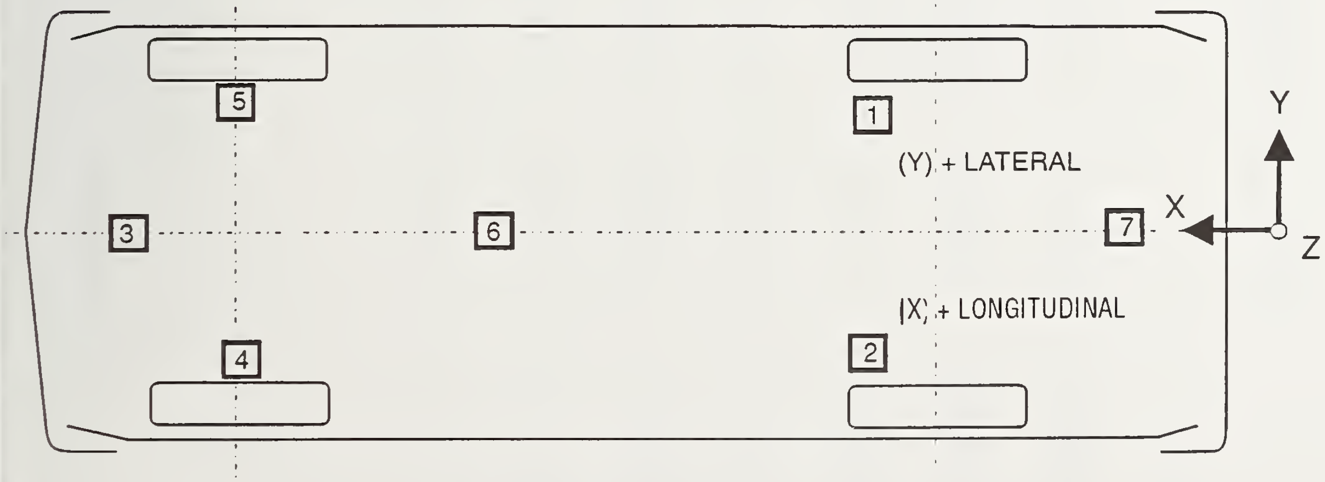
	Pre-test	Post-test	Crush
L	1525 mm		
C1	3652 mm	3469 mm	183 mm
C2	3804 mm	3337 mm	467 mm
C3	3931 mm	3211 mm	720 mm
C4	3933 mm	NA[1]	NA[1]
C5	3814 mm	NA[1]	NA[1]
C6	3651 mm	NA[1]	NA[1]
CL	3952 mm	3222 mm	730 mm

[1] The right side of the vehicle's front bumper was destroyed during the impact event.

Figure 3 Vehicle Accelerometer Placement



SIDE VIEW



BOTTOM VIEW

Table 4 Vehicle Accelerometer Locations and Data Summary

TEST NUMBER: 950605

No. LOCATION	X	Y	Z	POSITIVE DIRECTION		NEGATIVE DIRECTION	
1 LEFT SEAT CROSSMEMBER	1302 mm	626 mm	150 mm				
LONGITUDINAL				0.7 g	@ 106.4 ms	35.6 g	@ 81.9 ms
2 RIGHT SEAT CROSSMEMBER	1300 mm	-609 mm	152 mm				
LONGITUDINAL				0.7 g	@ 109.8 ms	36.4 g	@ 78.3 ms
3 FRONT BULKHEAD CENTER	3145 mm	-65 mm	286 mm				
LONGITUDINAL[1]				11.8 g	@ 19.8 ms	51.8 g	@ 25.9 ms
VERTICAL[1]				41.5 g	@ 49.9 ms	29.8 g	@ 34.9 ms
4 RIGHT BRAKE CALIPER	2888 mm	-707 mm	270 mm				
LONGITUDINAL				13.2 g	@ 38.4 ms	81.8 g	@ 58.8 ms
5 LEFT BRAKE CALIPER	2890 mm	708 mm	256 mm				
LONGITUDINAL				39.5 g	@ 33.4 ms	80.6 g	@ 44.2 ms
6 INSTRUMENT PANEL CENTER	2414 mm	0 mm	834 mm				
LONGITUDINAL				60.6 g	@ 15.6 ms	89.5 g	@ 89.3 ms
7 REAR BATTERY COMPARTMENT	430 mm	115 mm	144 mm				
LONGITUDINAL				0.5 g	@ 21.0 ms	33.8 g	@ 81.1 ms
VERTICAL				16.9 g	@ 67.0 ms	9.1 g	@ 109.1 ms

REFERENCE:
X: + FORWARD FROM REAR BUMPER
Y: + LEFTWARD FROM VEHICLE CENTERLINE
Z: + UPWARD FROM GROUND LEVEL

[1] See DATA ACQUISITION EXPLANATIONS

Section 3.0

FMVSS 208 Data

Table 5 Dummy Data Summary

TEST NUMBER: 950605

DRIVER DUMMY SERIAL NUMBER: 083

	POSITIVE DIRECTION		NEGATIVE DIRECTION	
HEAD ACCELERATION				
LONGITUDINAL	2.1 g	@ 228.5 ms	61.6 g	@ 113.0 ms
LATERAL	4.6 g	@ 113.4 ms	5.9 g	@ 105.6 ms
VERTICAL	10.3 g	@ 111.4 ms	35.6 g	@ 97.6 ms
RESULTANT	61.7 g	@ 113.3 ms		
HIC	373 from 91.0 to 127.0			
CHEST ACCELERATION				
LONGITUDINAL	0.3 g	@ 193.1 ms	43.0 g	@ 97.0 ms
LATERAL	10.7 g	@ 94.2 ms	4.3 g	@ 131.0 ms
VERTICAL	20.4 g	@ 107.9 ms	9.8 g	@ 76.6 ms
RESULTANT	45.1 g	@ 101.4 ms		
3 MSEC	41.8			
CHEST DEFLECTION				
LONGITUDINAL	0.1 mm	@ 51.4 ms	30.6 mm	@ 130.6 ms
FEMUR LOAD				
LEFT	847.0 N	@ 78.6 ms	2749.7 N	@ 87.2 ms
RIGHT	1221.0 N	@ 90.7 ms	793.3 N	@ 111.0 ms

POSITIVE DIRECTION		NEGATIVE DIRECTION	
LONGITUDINAL:	FORWARD	LONGITUDINAL:	REARWARD
LATERAL:	LEFTWARD	LATERAL:	RIGHTWARD
VERTICAL:	UPWARD	VERTICAL:	DOWNWARD
FORCE:	TENSION	FORCE:	COMPRESSION

Table 5 Dummy Data Summary, Cont'd.

TEST NUMBER: 950605

PASSENGER DUMMY SERIAL NUMBER: 177

	POSITIVE DIRECTION		NEGATIVE DIRECTION	
HEAD ACCELERATION				
LONGITUDINAL	3.2 g	@ 222.9 ms	37.9 g	@ 135.2 ms
LATERAL	2.9 g	@ 126.5 ms	3.6 g	@ 133.9 ms
VERTICAL	2.0 g	@ 49.4 ms	54.0 g	@ 117.5 ms
RESULTANT	58.6 g	@ 117.7 ms		
HIC	592 from 101.4 to 137.4			
CHEST ACCELERATION				
LONGITUDINAL	1.6 g	@ 171.5 ms	47.6 g	@ 97.2 ms
LATERAL	5.7 g	@ 92.1 ms	11.7 g	@ 84.1 ms
VERTICAL	9.5 g	@ 88.0 ms	9.3 g	@ 76.7 ms
RESULTANT	47.6 g	@ 97.2 ms		
3 MSEC	40.0			
CHEST DEFLECTION				
LONGITUDINAL	0.0 mm	@ 34.4 ms	28.2 mm	@ 102.3 ms
FEMUR LOAD				
LEFT	1032.3 N	@ 69.3 ms	5536.0 N	@ 80.5 ms
RIGHT	839.3 N	@ 80.6 ms	7663.7 N	@ 91.0 ms

POSITIVE DIRECTION
LONGITUDINAL: FORWARD
LATERAL: LEFTWARD
VERTICAL: UPWARD
FORCE: TENSION

NEGATIVE DIRECTION
LONGITUDINAL: REARWARD
LATERAL: RIGHTWARD
VERTICAL: DOWNWARD
FORCE: COMPRESSION

Table 6 Post-Impact Dummy/Vehicle Data

Visible Dummy Contact Points:

	Driver #083	Passenger #177
Head	Steering wheel rim	Dash panel
Chest	None	None
Abdomen	Steering wheel rim	None
Left knee	None	Circuit board box
Right knee	None	Right dash panel support member

Door Opening:

	Left	Right
Front	Easy	Easy
Rear	NA	NA

Seat Movement:

	Seat Back Failure	Seat Shift
Front	None	None
Rear	NA	NA

Glazing Damage:	Entire windshield broke away from vehicle during impact event.
Other Notable Impact Effects:	Driver seat belt latch anchor failed.

Dummy Kinematic Summary

Driver Dummy

Upon impact the driver dummy translated forward across the seat and was restrained by the 3-point unibelt. The dummy's hands and forearms contacted the instrument panel and its abdomen contacted the lower half of the steering wheel rim. The dummy's head rotated forward and contacted the top surface of the steering wheel rim between the dummy's nose and mouth. At approximately this time, the seat belt latch anchor broke and the dummy's pelvis rose out of the seat. The dummy's abdomen rode up the steering wheel, then the dummy translated rearward and came to rest sitting upright and facing forward in the driver's seat.

Right Front Passenger Dummy

Upon impact the passenger dummy translated forward across the seat and was restrained by the 3-point unibelt. The dummy's head rotated forward and the top surface of the dummy's head contacted the instrument panel. The dummy then rebounded rearward into the seat and came to rest sitting upright and facing forward in the right front passenger's seat restrained by the three-point unibelt.

Section 4.0

Vehicle, Occupant, and Camera Information

Figure 4 Pre-test and Post-test Measurements Points

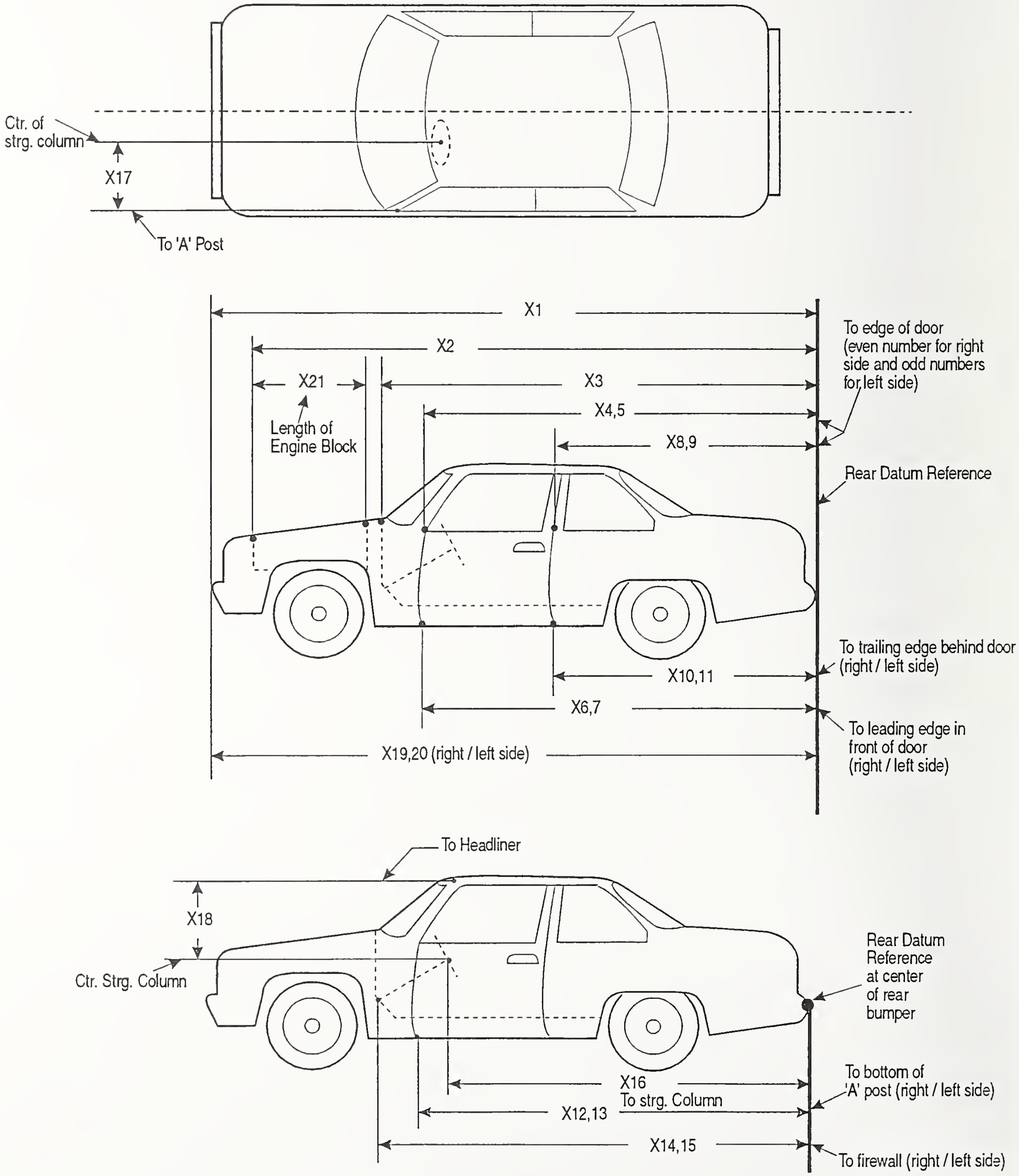

Ctr. of strg. column
X17
To 'A' Post
X1
X2
X21
X3
Length of Engine Block
X4,5
X8,9
To edge of door (even number for right side and odd numbers for left side)
Rear Datum Reference
X10,11
To trailing edge behind door (right / left side)
X6,7
To leading edge in front of door (right / left side)
X19,20 (right / left side)
To Headliner
X18
Ctr. Strg. Column
Rear Datum Reference at center of rear bumper
X16
To strg. Column
X12,13
To bottom of 'A' post (right / left side)
X14,15
To firewall (right / left side)

Table 7 Impacted Vehicle Measurements

Vehicle Make/Model: Renaissance Cars/Tropica Test Number: 950605

No.	Type of measurement	Pre-test	Post-test	Diff.
X1	Total length of vehicle at centerline	3952 mm	3222 mm	730 mm
X2	Rear surface of vehicle to front of engine block[1]	3239 mm	2921 mm	318 mm
X3	Rear surface of vehicle to firewall	2980 mm	2702 mm	278 mm
X4	Rear surface of vehicle to upper leading edge of right door	2412 mm	2411 mm	1 mm
X5	Rear surface of vehicle to upper leading edge of left door	2424 mm	2412 mm	12 mm
X6	Rear surface of vehicle to lower leading edge of right door	2436 mm	2425 mm	11 mm
X7	Rear surface of vehicle to lower leading edge of left door	2422 mm	2407 mm	15 mm
X8	Rear surface of vehicle to upper trailing edge of right door	1249 mm	1245 mm	4 mm
X9	Rear surface of vehicle to upper trailing edge of left door	1242 mm	1234 mm	8 mm
X10	Rear surface of vehicle to lower trailing edge of right door	1440 mm	1433 mm	7 mm
X11	Rear surface of vehicle to lower trailing edge of left door	1436 mm	1423 mm	13 mm
X12	Rear surface of vehicle to bottom of "A" post on right side	2414 mm	2405 mm	9 mm
X13	Rear surface of vehicle to bottom of "A" post on left side	2414 mm	2397 mm	17 mm
X14	Rear surface of vehicle to firewall - right side	2987 mm	2704 mm	283 mm
X15	Rear surface of vehicle to firewall - left side	2982 mm	2791 mm	191 mm
X16	Rear surface of vehicle to steering wheel center	1926 mm	1884 mm	42 mm
X17	Center of steering column to "A" post	310 mm	311 mm	-1 mm
X18	Center of steering column to headliner	NA	NA	NA
X19	Rear surface of vehicle to right side of front bumper	3651 mm	NA[2]	NA[2]
X20	Rear surface of vehicle to left side of front bumper	3652 mm	3469 mm	183 mm
X21	Length of engine block	NA	NA	NA

[1] Measured to rear surface of front battery box.

[2] The right side of vehicle's front bumper was destroyed during the impact.

Figure 5 Vehicle Target Locations

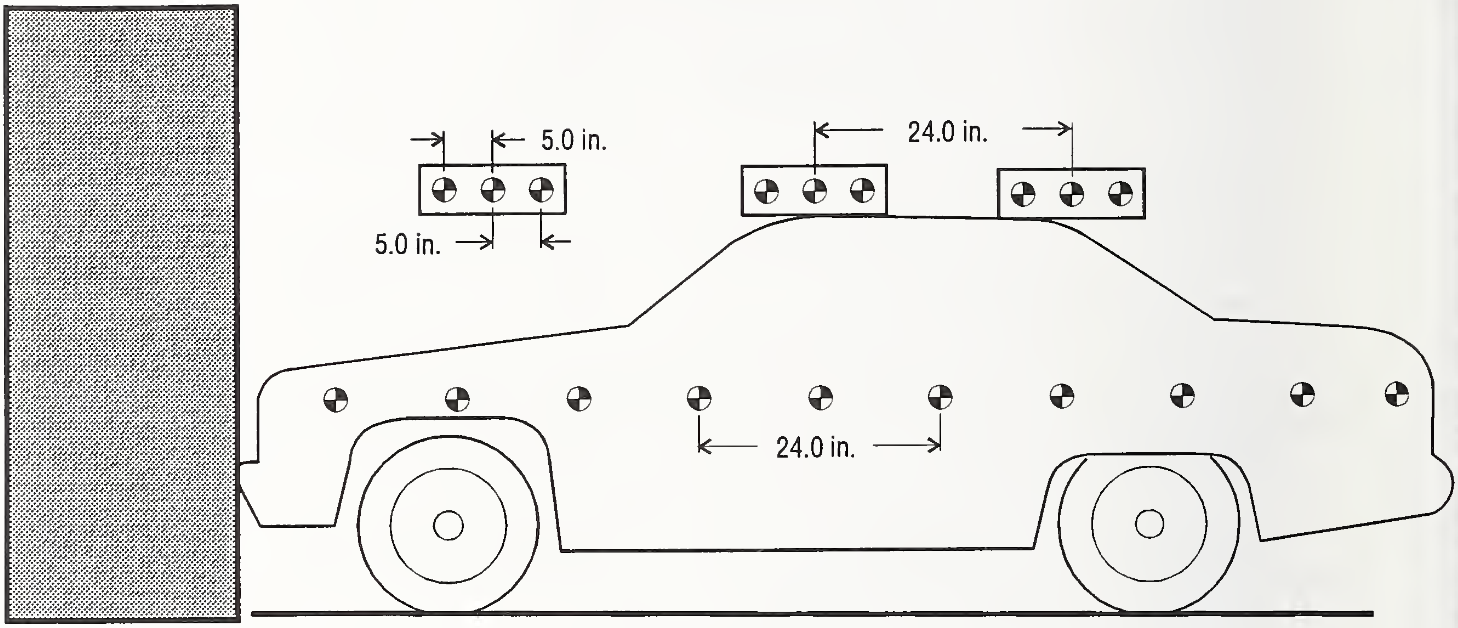
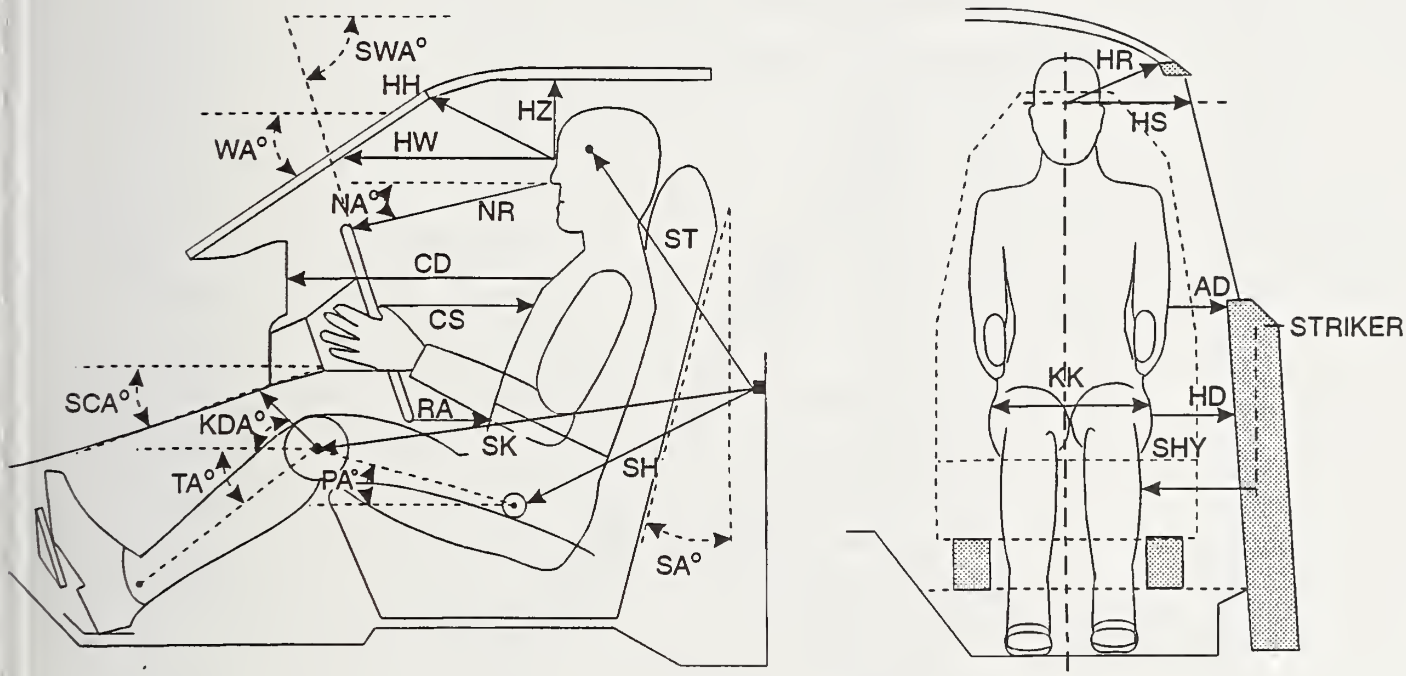


Figure 6 Dummy Measurement Locations for Front Seat Occupants



VERTICAL LONGITUDINAL PLANE

VERTICAL TRANSVERSE PLANE

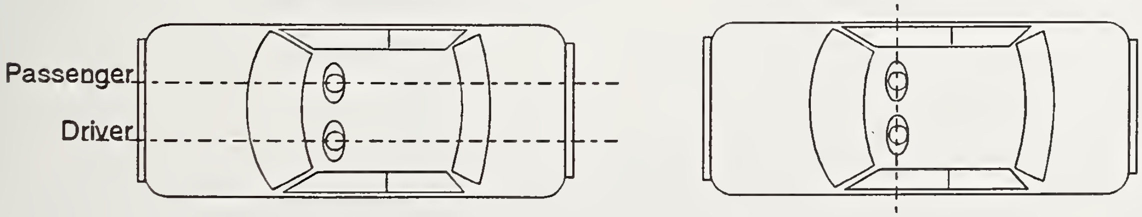


Table 8 Dummy Measurement Data for Front Seat Occupants

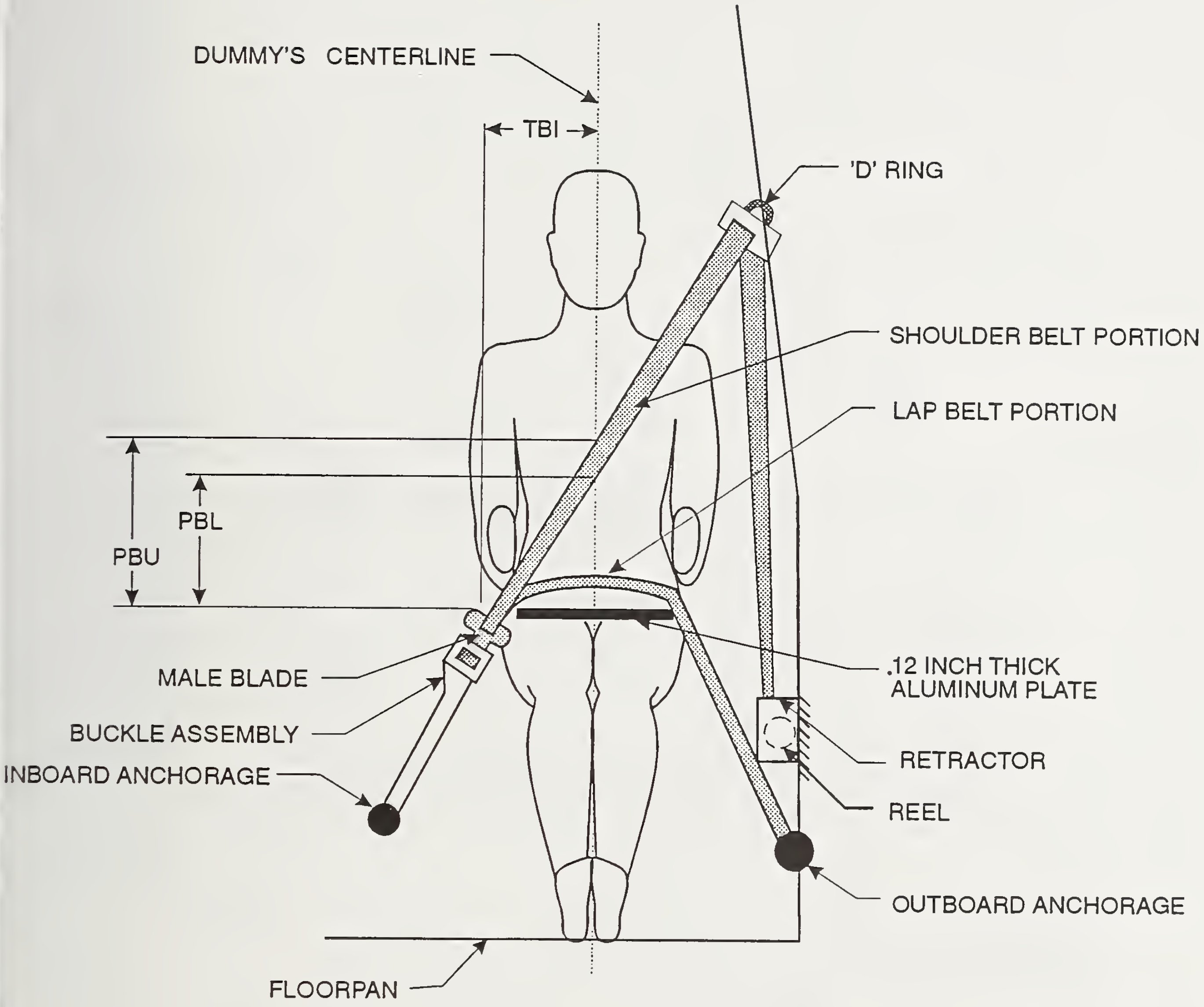
Designation	Type of Measurement	Driver (Serial #083)	Passenger (Serial #177)
WA	Windshield angle	24°	NA
SWA	Steering wheel angle	68°	NA
SCA	Steering column angle	22°	NA
SA	Seat back angle	26°	26°
HZ	Head to roof	NA	NA
HH	Head to header	NA	NA
HW	Head to windshield	910 mm	877 mm
HR	Head to side header	NA	NA
NR	Nose to rim	413 mm	NA
NA	Nose to rim angle	9°	NA
CD	Chest to dash	555 mm	514 mm
CS	Steering wheel to chest	371 mm	NA
RA	Rim to abdomen	227 mm	NA
KDL	Left knee to dash	215 mm	200 mm
KDR	Right knee to dash	168 mm	211 mm
KDA	Outboard knee to dash angle	76°	69°
PA	Pelvic angle	22°	23°
TA	Tibial angle	33°	32°
KK	Knee to knee	295 mm	268 mm
ST[1]	Striker to head	438 mm	442 mm
	Striker to head angle	-82°	-79°
SK[2]	Striker to knee	621 mm	617 mm
	Striker to knee angle	11°	-11°
SH[1]	Striker to H-point	NA	NA
	Striker to H-point angle	NA	NA
SHY	Striker to H-point (Y dir.)	185 mm	176 mm
HS	Head to side window	NA	NA
HD	H-point to door	160 mm	110 mm
AD	Arm to door	42 mm	41 mm

The seat back angle (SA°) is measured relative to vertical, all other angles are measured relative to horizontal.

[1] A negative angle indicates that the measurement point was above the striker.

[2] The dummy's H-point was obstructed by the seat.

Figure 7 Seat Belt Positioning Data



		Driver	Passenger
PBU	- Top surface of aluminum plate to belt upper edge	382 mm	360 mm
PBL	- Top surface of aluminum plate to belt lower edge	312 mm	291 mm
TBI	- Dummy centerline to intersection of upper torso belt and lap belt	287 mm	276 mm

Figure 8 Camera Positions

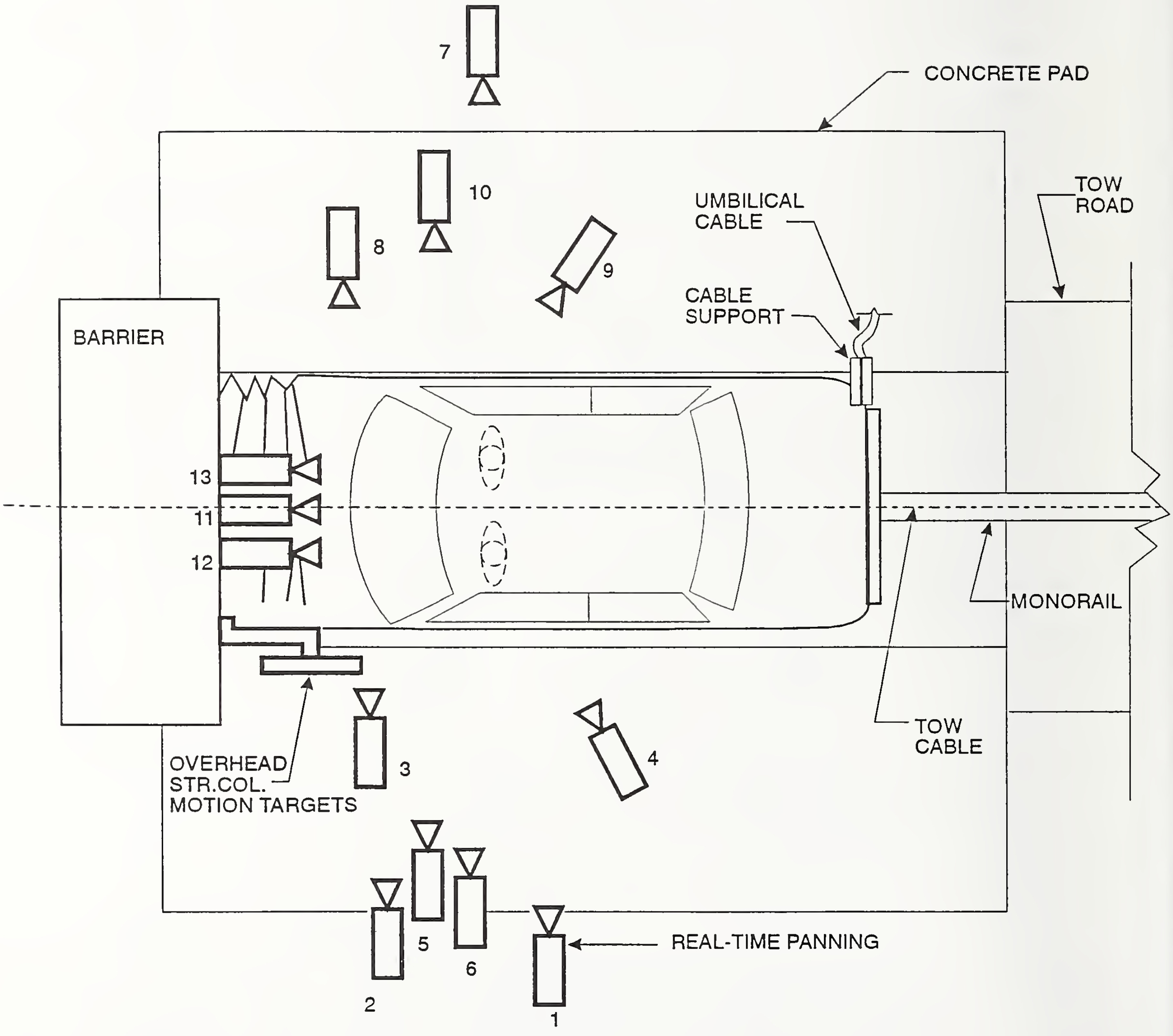


Figure 8 Camera Positions, Cont'd.

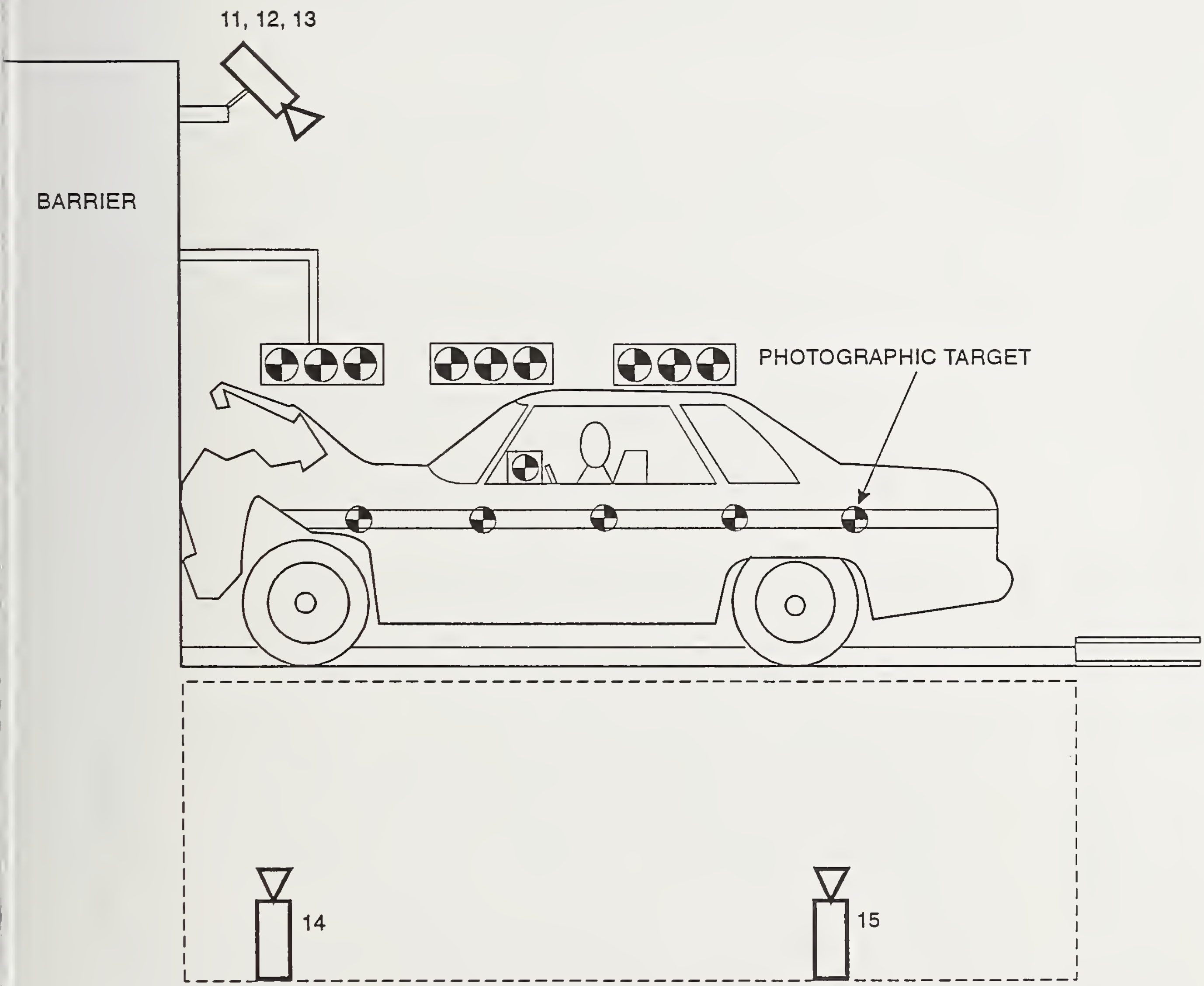


Table 9 Motion Picture Camera Locations

Test Number: 950605

Vehicle year/make/model/body style: NA/Renaissance Cars/Tropica/Roadster

Camera Number	View	Camera Positions[1] X	Y	Z	Angle[2]	Film Plane to Head Target	Lens	Film Speed
1	Real-time panning	-3607 mm	12802 mm	1549 mm	NA	NA mm	16 mm	24 frames/s
2	Left vehicle crush	-1029 mm	7493 mm	1118 mm	4°	6706 mm	25 mm	1042 frames/s
3	Left windshield intrusion	-1346 mm	7859 mm	1074 mm	0°	NA mm	50 mm	1002 frames/s
4	Driver kinematics	-3995 mm	2946 mm	2210 mm	-27°	2591 mm	25 mm	998 frames/s
5	Steering column motion	-1829 mm	7264 mm	2616 mm	-14°	NA mm	25 mm	998 frames/s
6	Steering column motion	-1829 mm	7264 mm	1908 mm	-9°	NA mm	25 mm	1002 frames/s
7	Right overall	-2065 mm	-6767 mm	942 mm	-2°	NA mm	13 mm	1000 frames/s
8	Right windshield intrusion	-968 mm	-7775 mm	1118 mm	0°	NA mm	50 mm	1002 frames/s
9	Passenger kinematics	-3863 mm	-2946 mm	2210 mm	-26°	2667 mm	25 mm	992 frames/s
10	Passenger kinematics	-986 mm	-7442 mm	1151 mm	-4°	5486 mm	25 mm	1000 frames/s
11	Windshield front view	-152 mm	0 mm	2235 mm	-40°	NA mm	13 mm	1012 frames/s
12	Driver - front view	-173 mm	368 mm	2362 mm	-50°	NA mm	17 mm	1002 frames/s
13	Passenger - front view	-114 mm	-351 mm	2362 mm	-50°	NA mm	17 mm	1002 frames/s
14	Pit - front position	-1283 mm	0 mm	-2347 mm	90°	NA mm	13 mm	1005 frames/s
15	Pit - rear position	-2522 mm	0 mm	-2515 mm	90°	NA mm	13 mm	1002 frames/s
16	Real-time documentation	NA	NA	NA	NA	NA	12-120 mm	24 frames/s

[1] +X = Film plane forward of barrier face
+Y = Film plane to left of monorail centerline
+Z = Film plane above ground level

[2] +Angle = Film plane angled upward from horizontal plane

Appendix A

Photographs

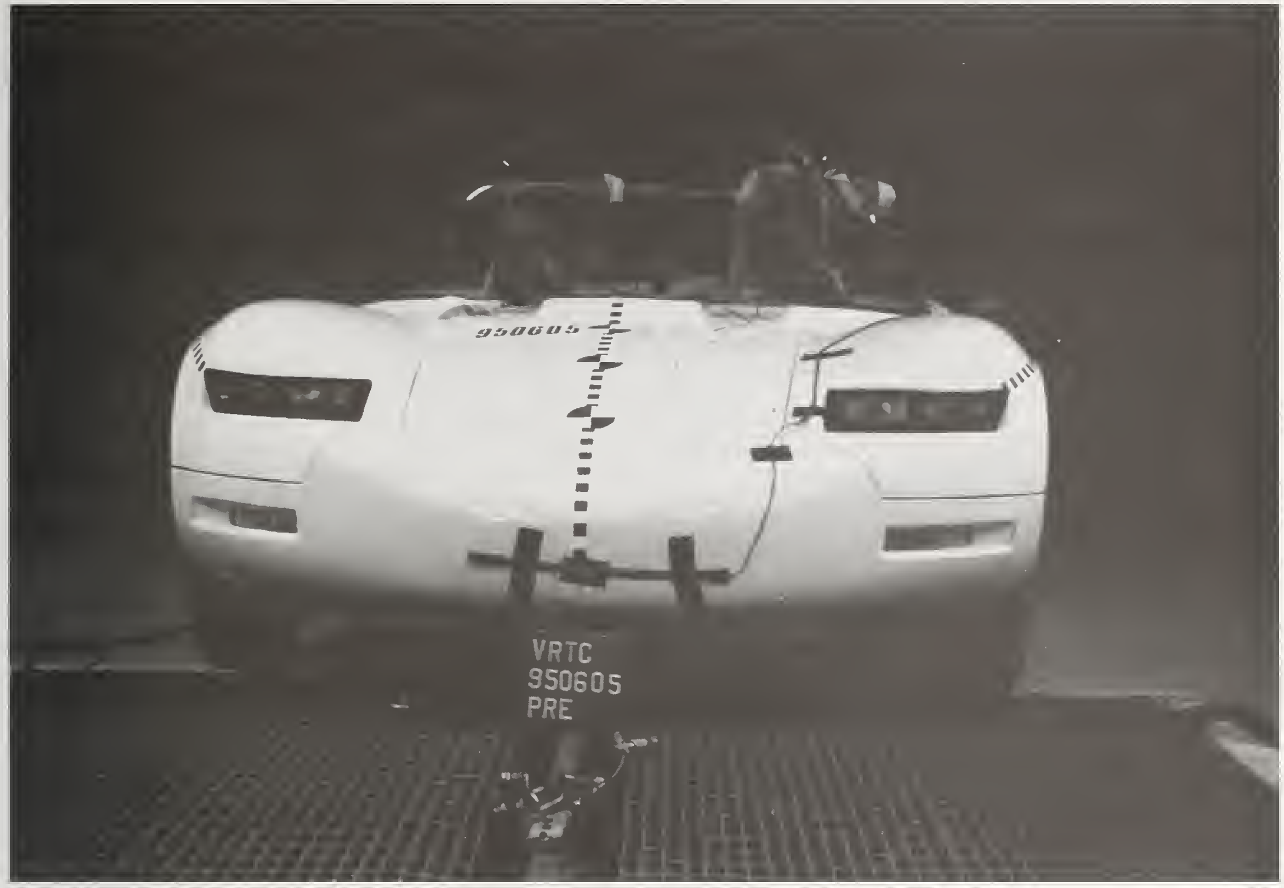


Figure A-1 Pre-test Front View

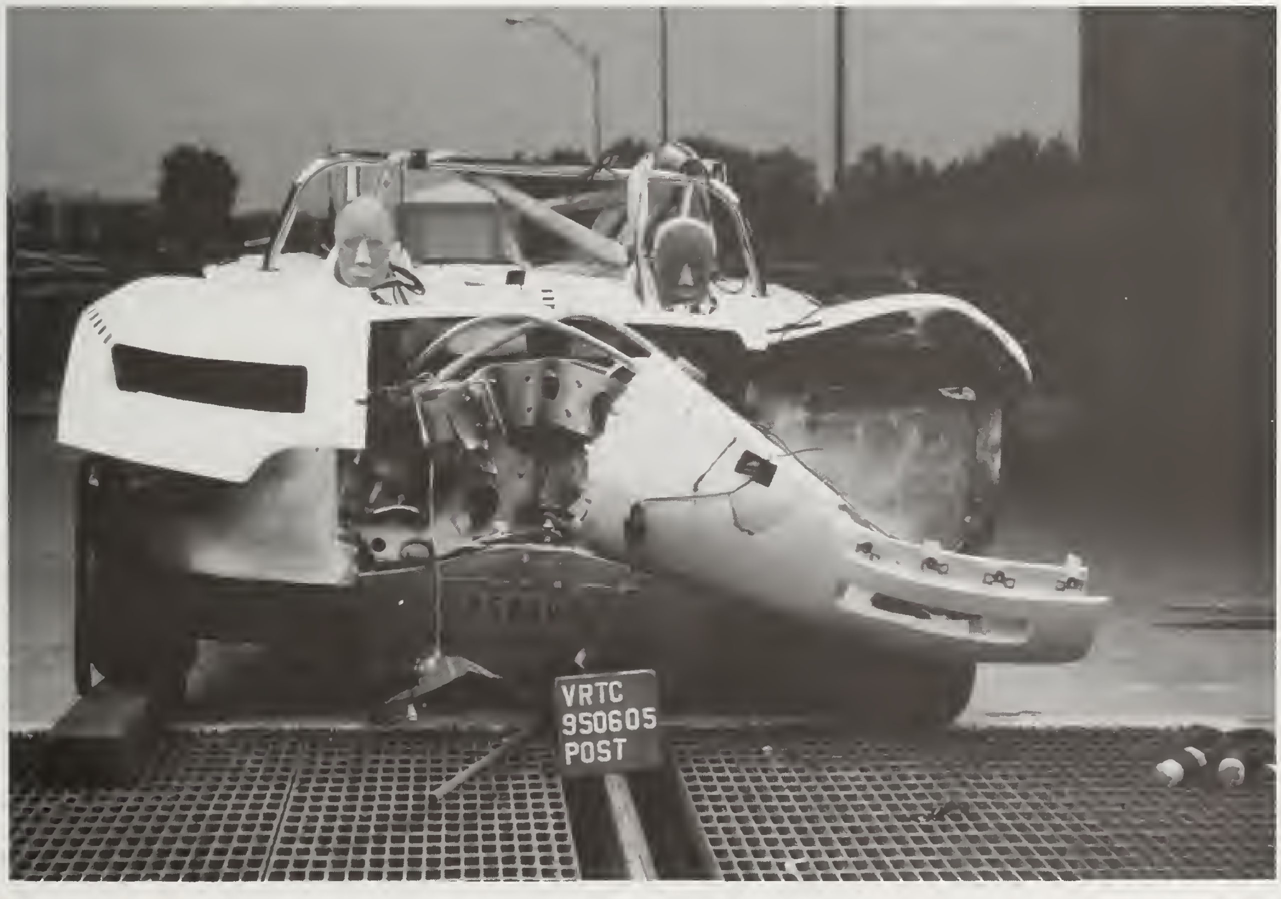


Figure A-2 Post-test Front View

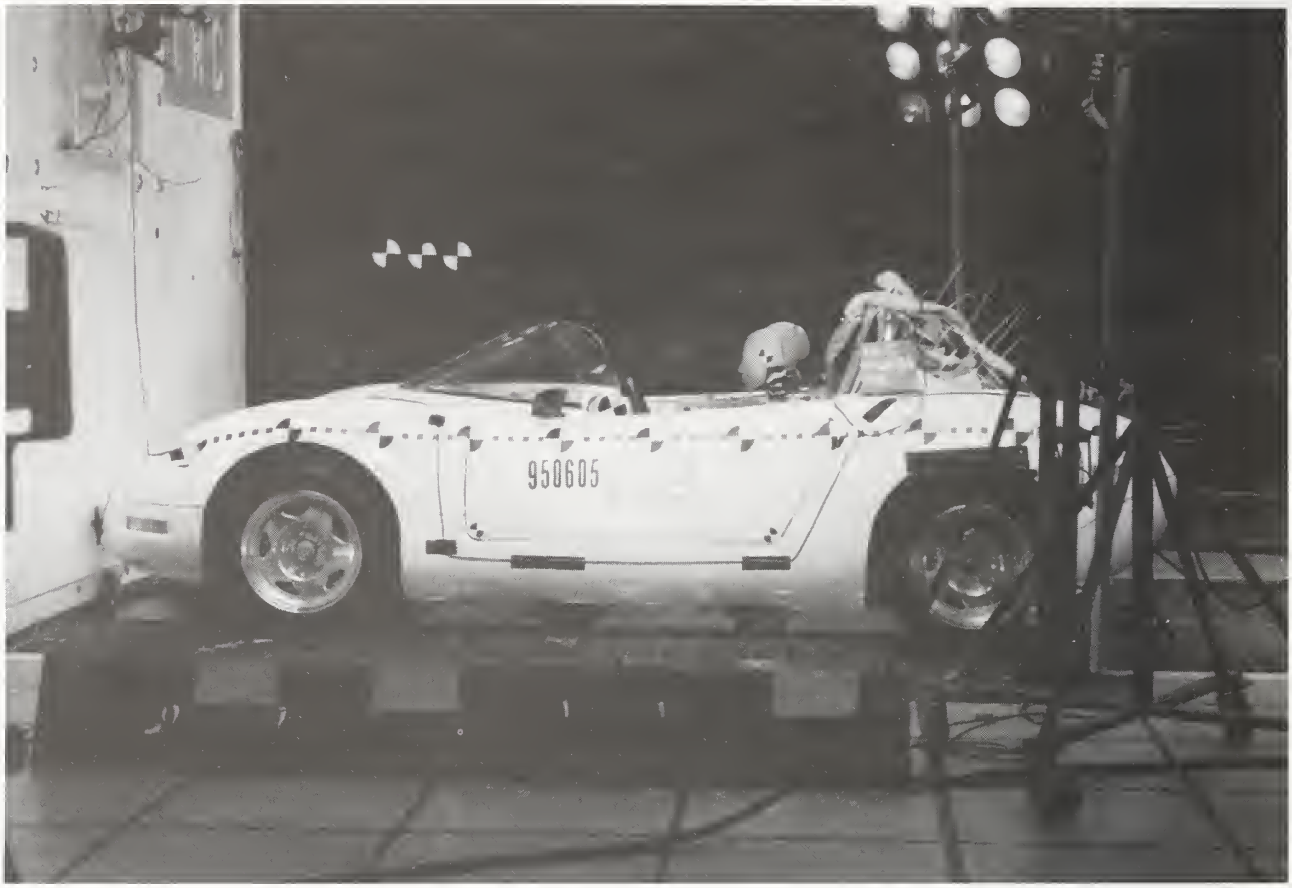


Figure A-3 Pre-test Left Side View

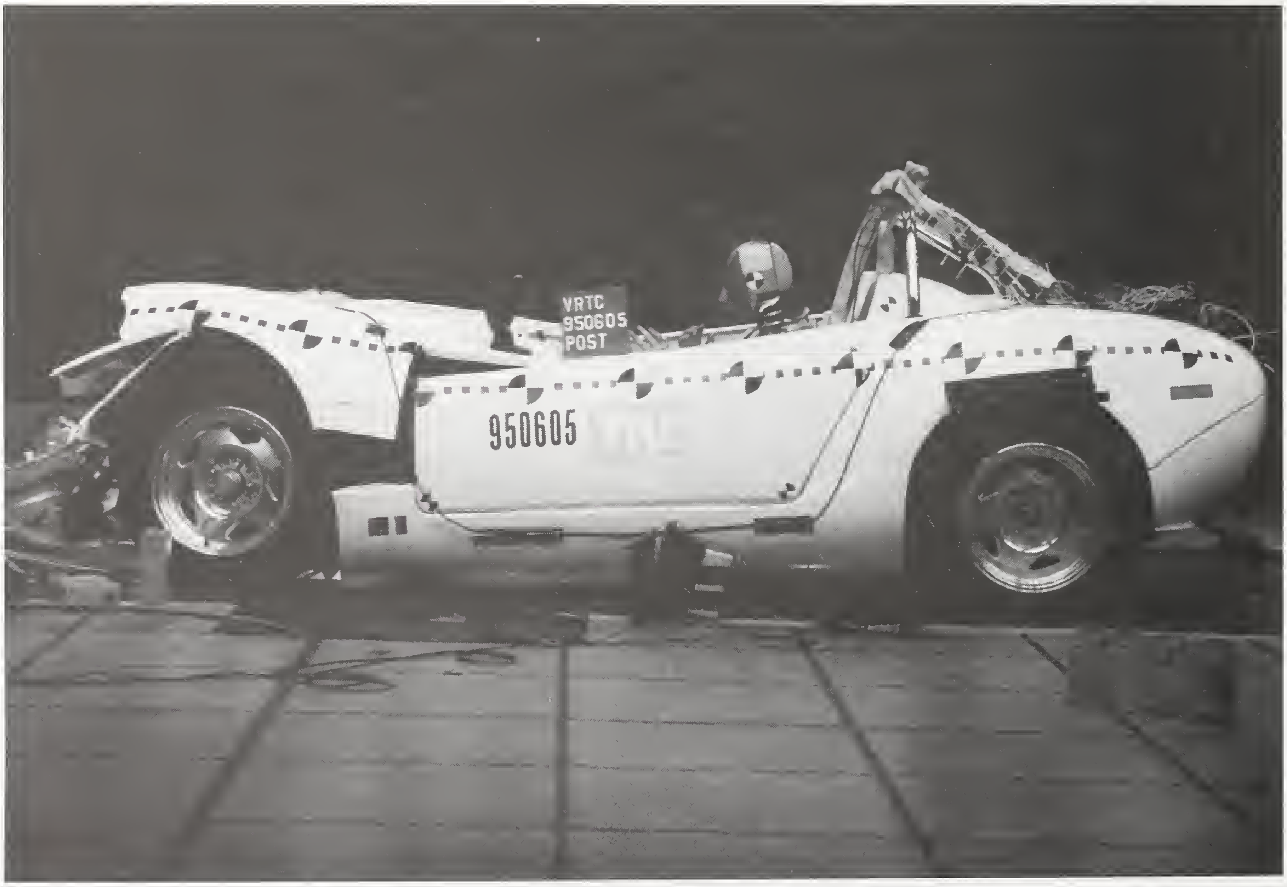


Figure A-4 Post-test Left Side View

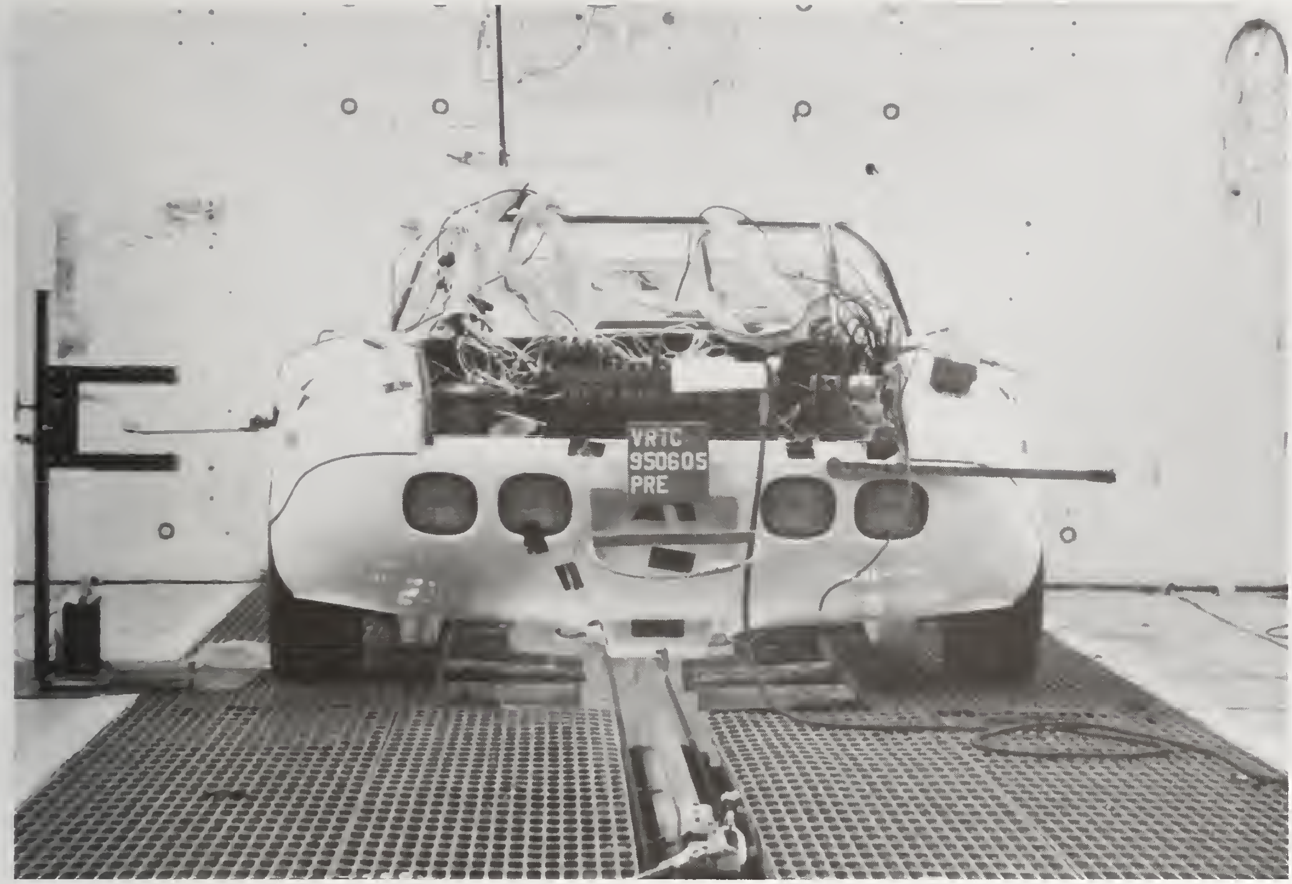


Figure A-5 Pre-test Rear View

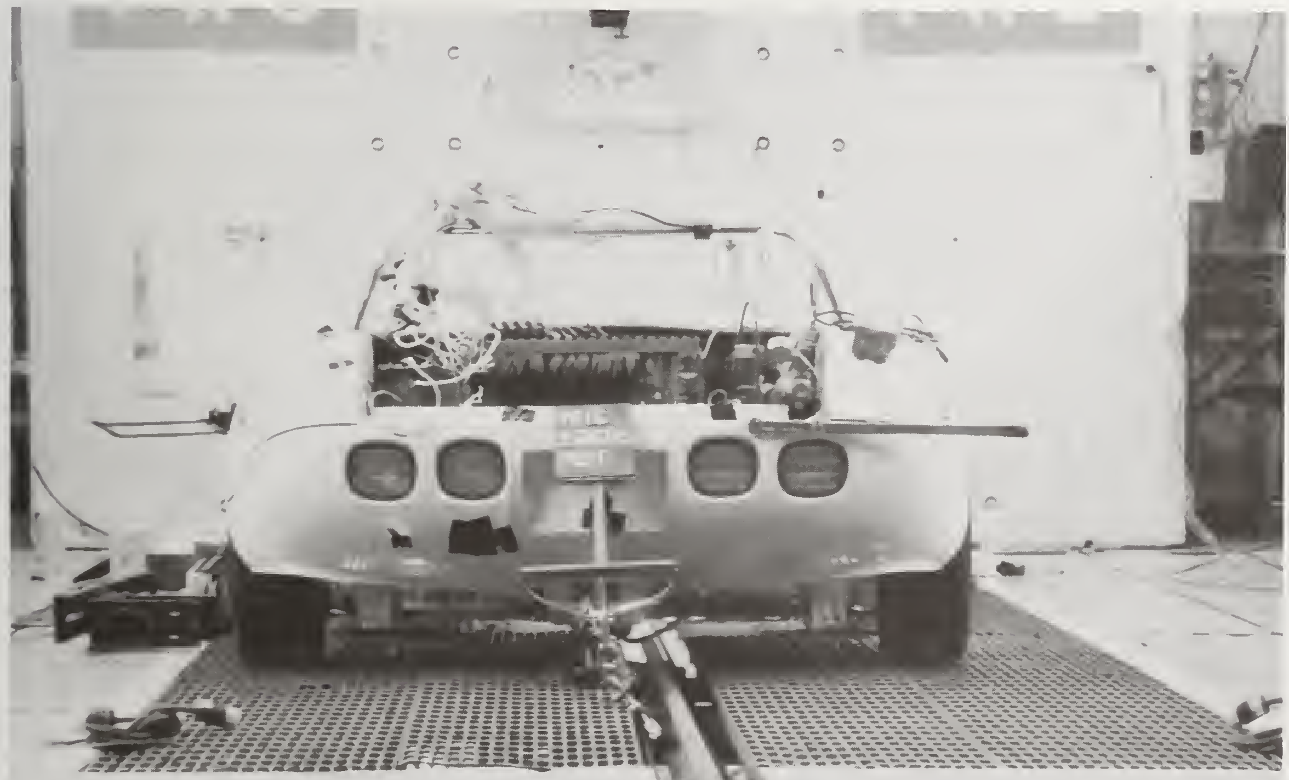


Figure A-6 Post-test Rear View

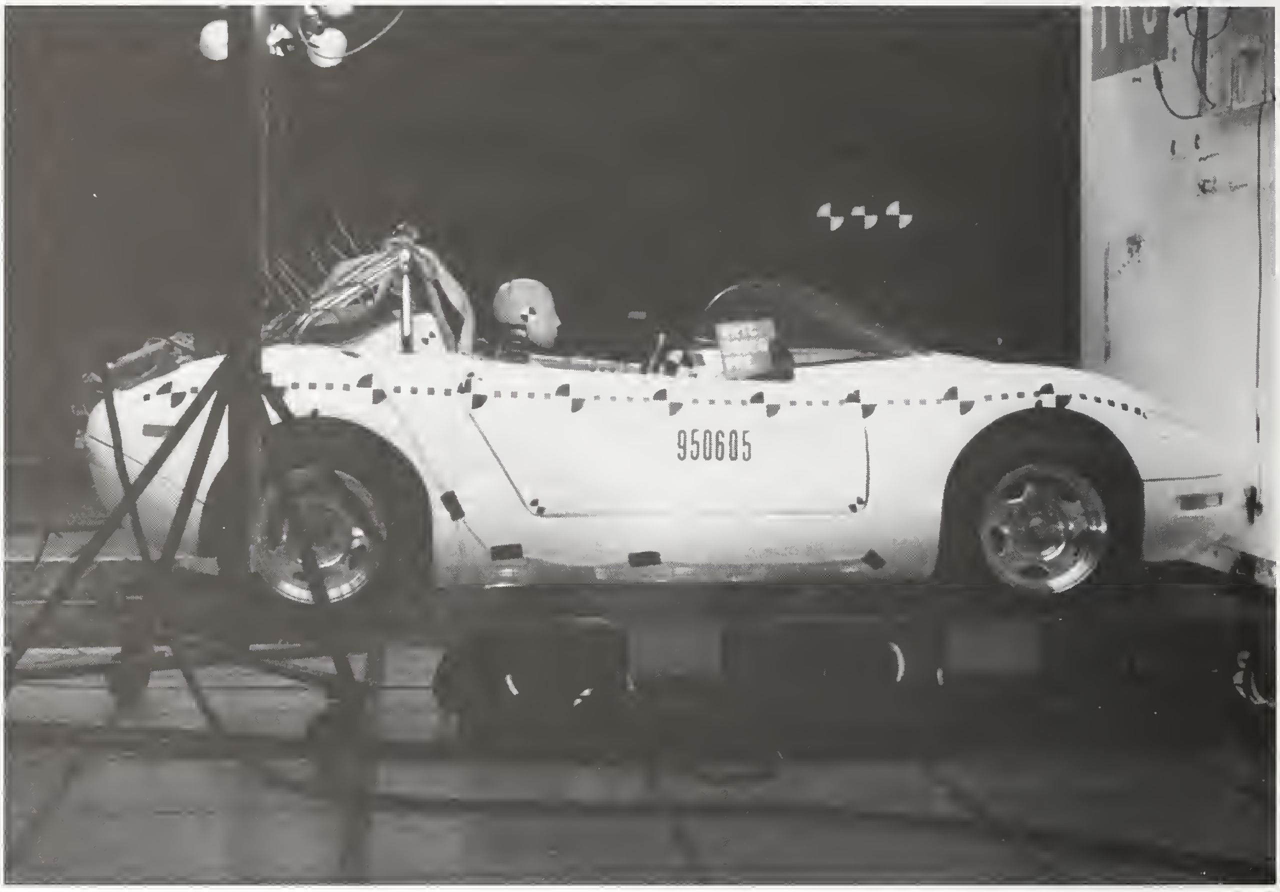


Figure A-7 Pre-test Right Side View

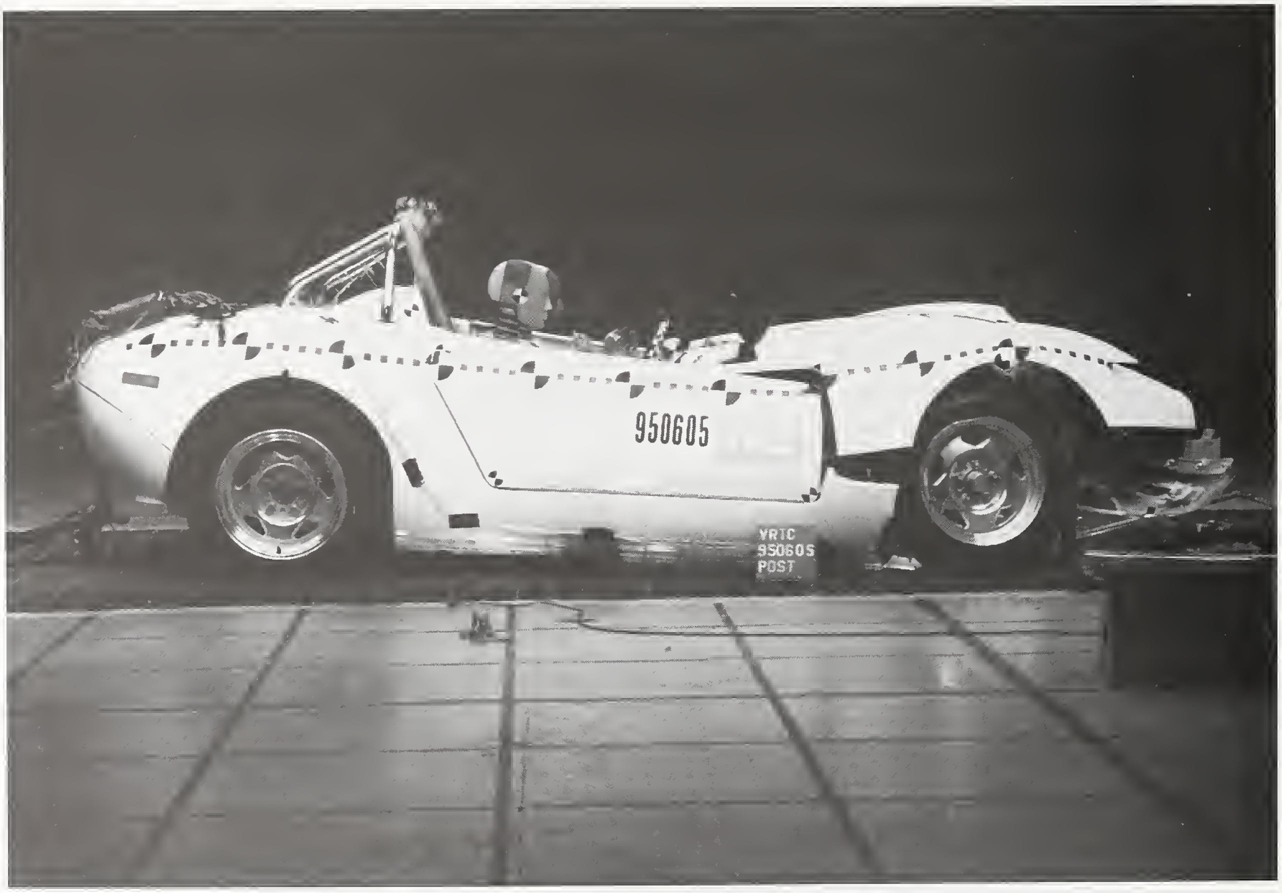


Figure A-8 Post-test Right Side View

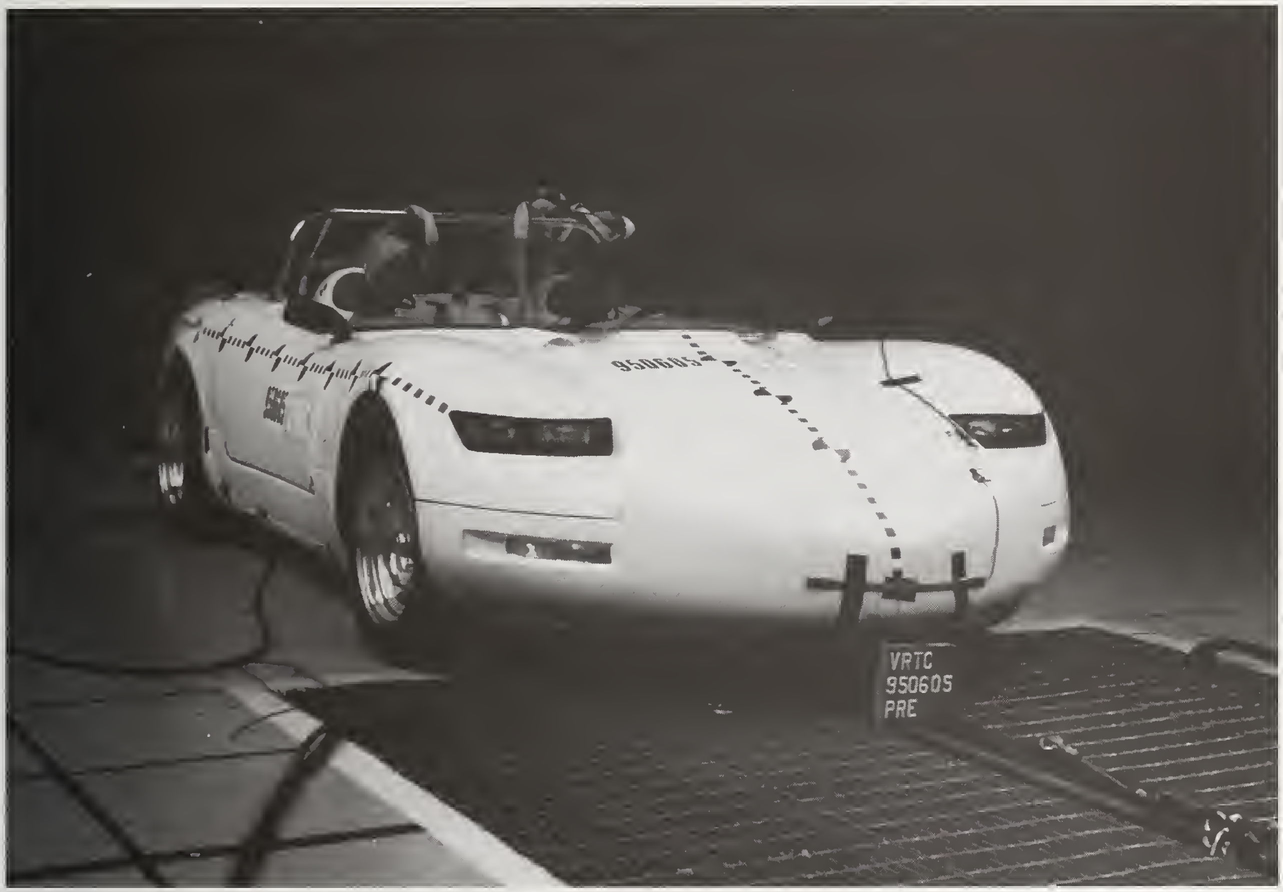


Figure A-9 Pre-test Right Front Three-quarter View

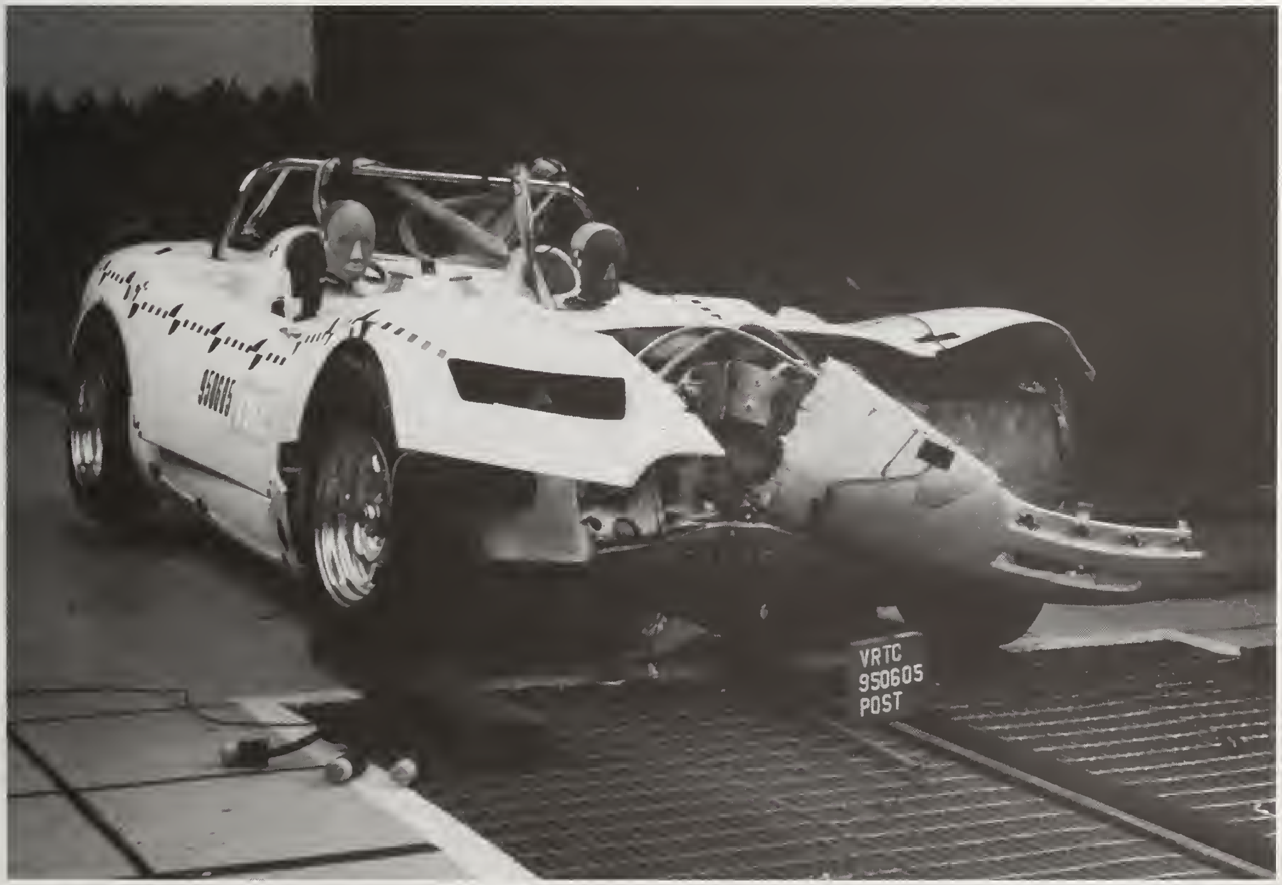


Figure A-10 Post-test Right Front Three-quarter View

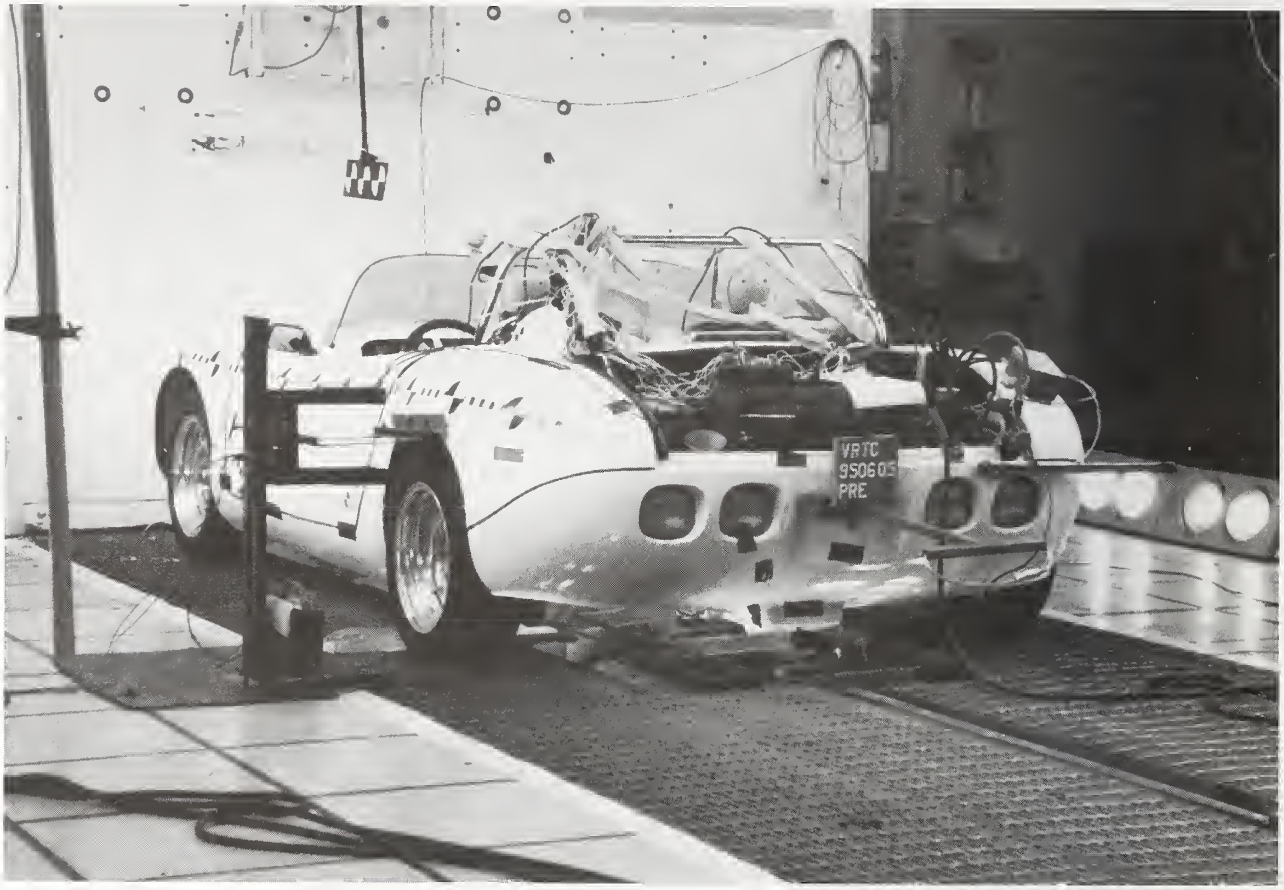


Figure A-11 Pre-test Left Rear Three-quarter View

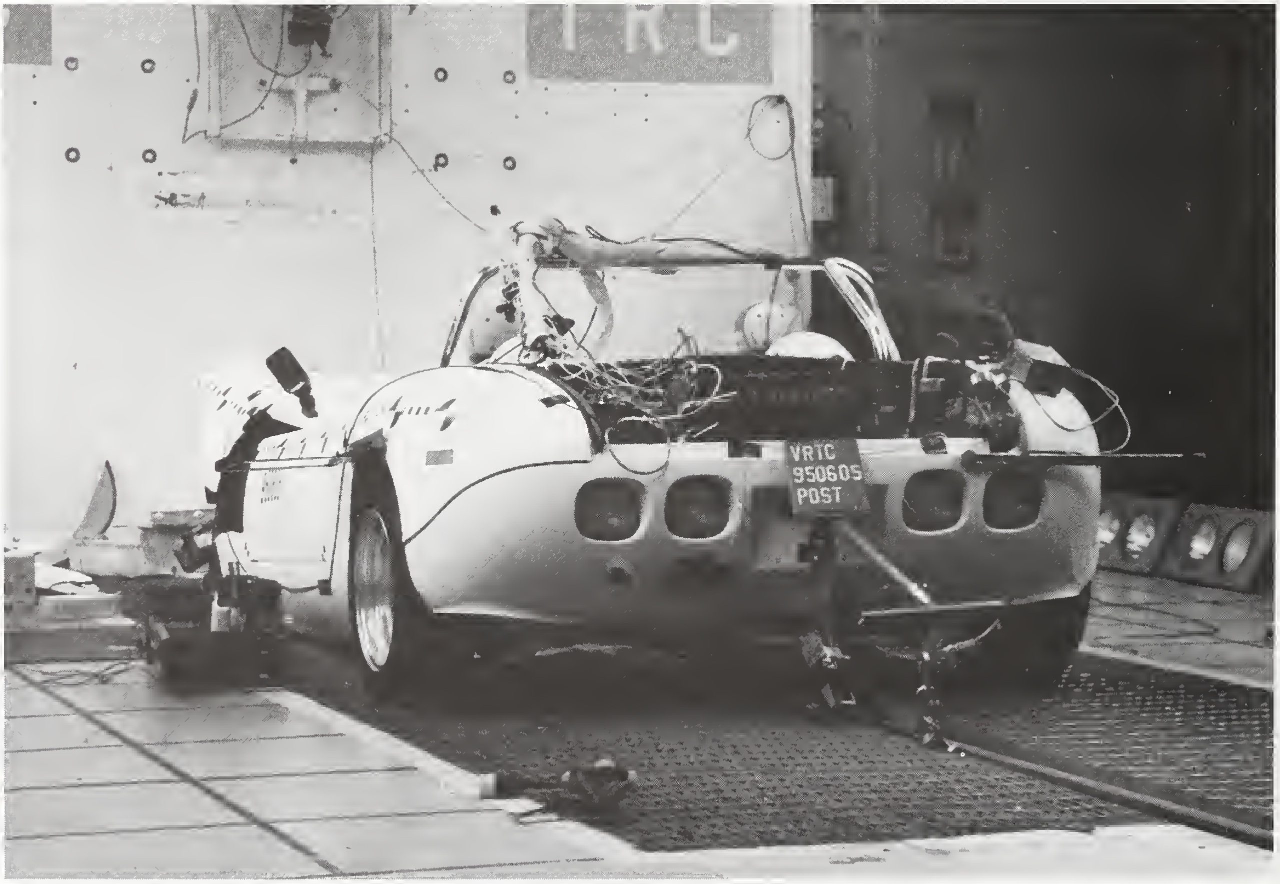


Figure A-12 Post-test Left Rear Three-quarter View

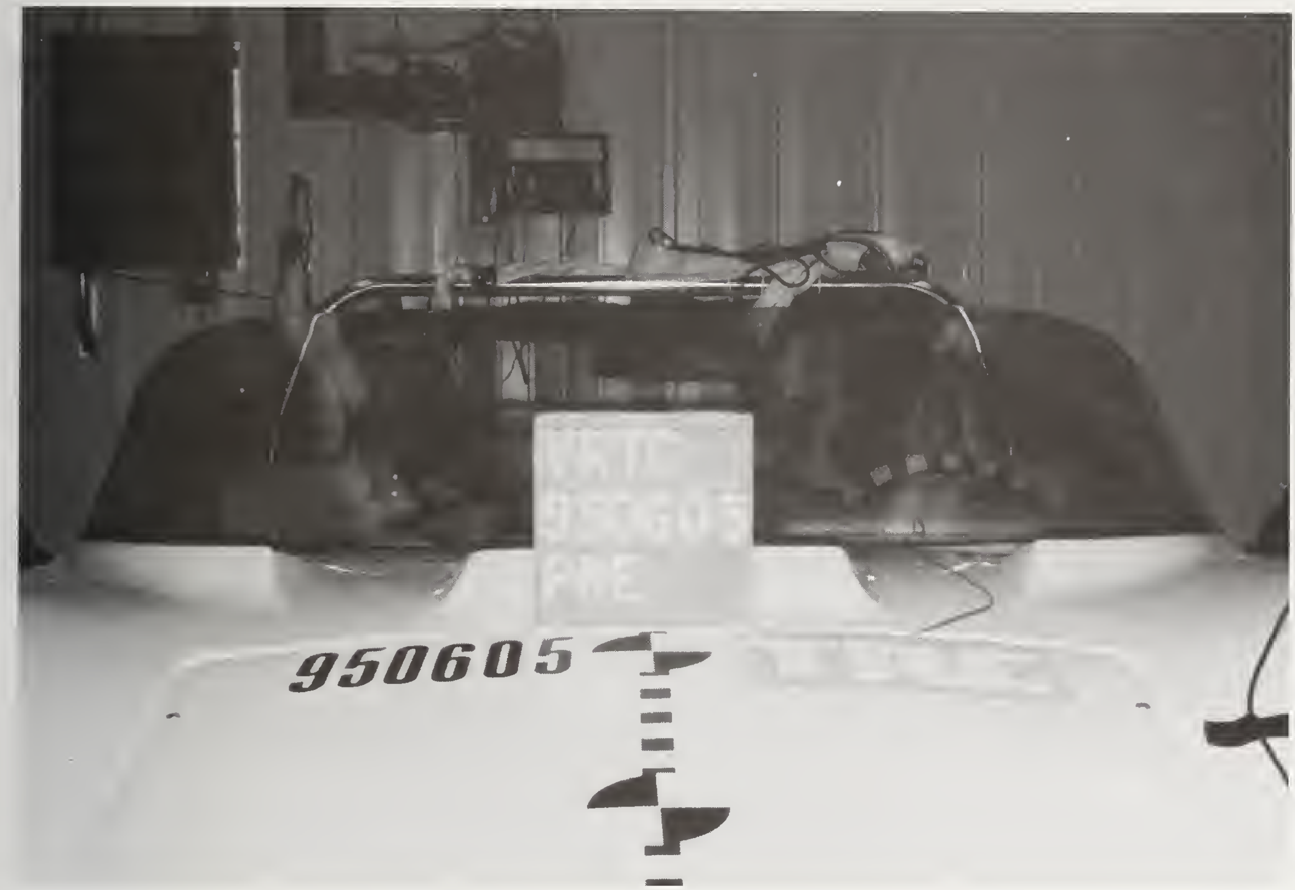


Figure A-13 Pre-test Windshield View

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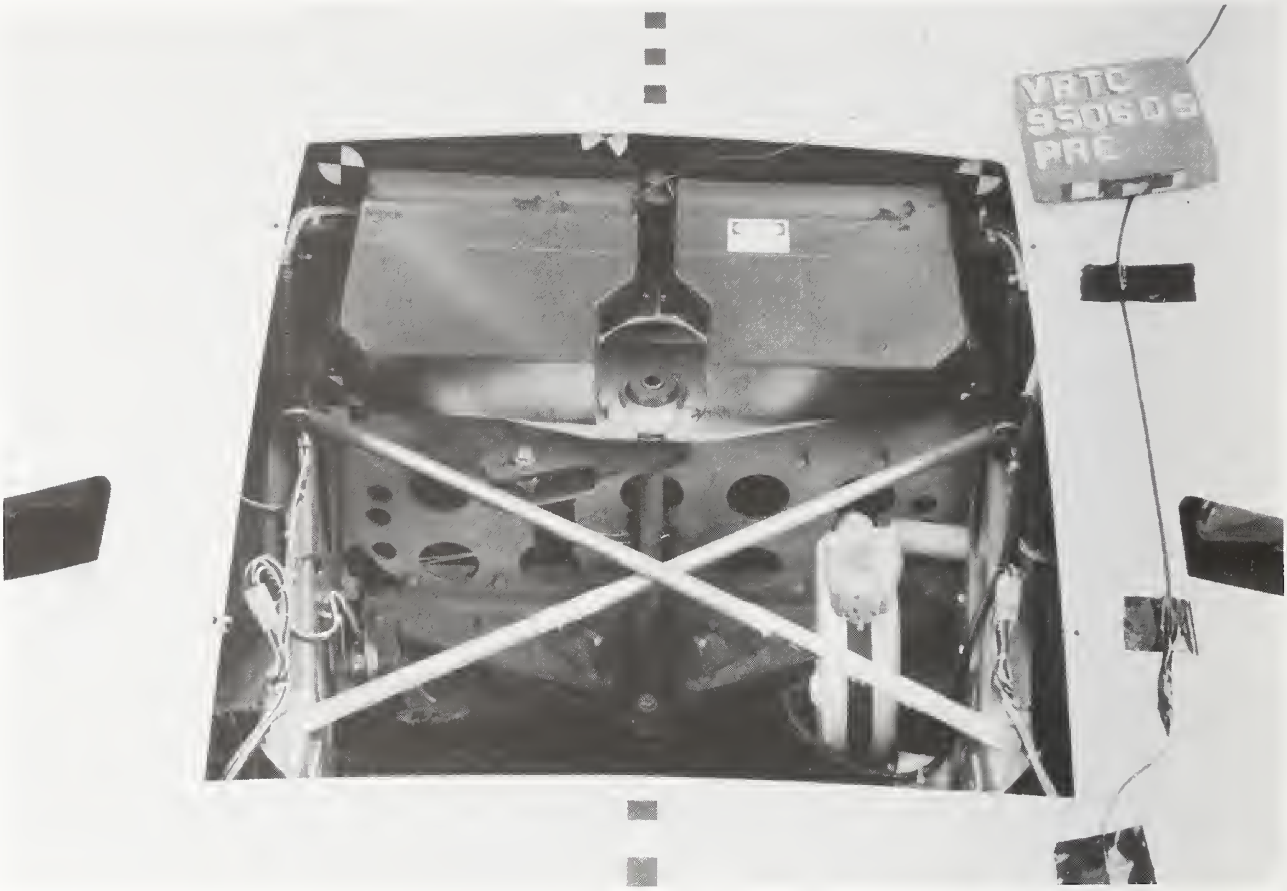

Figure A-14 Pre-test Underhood View

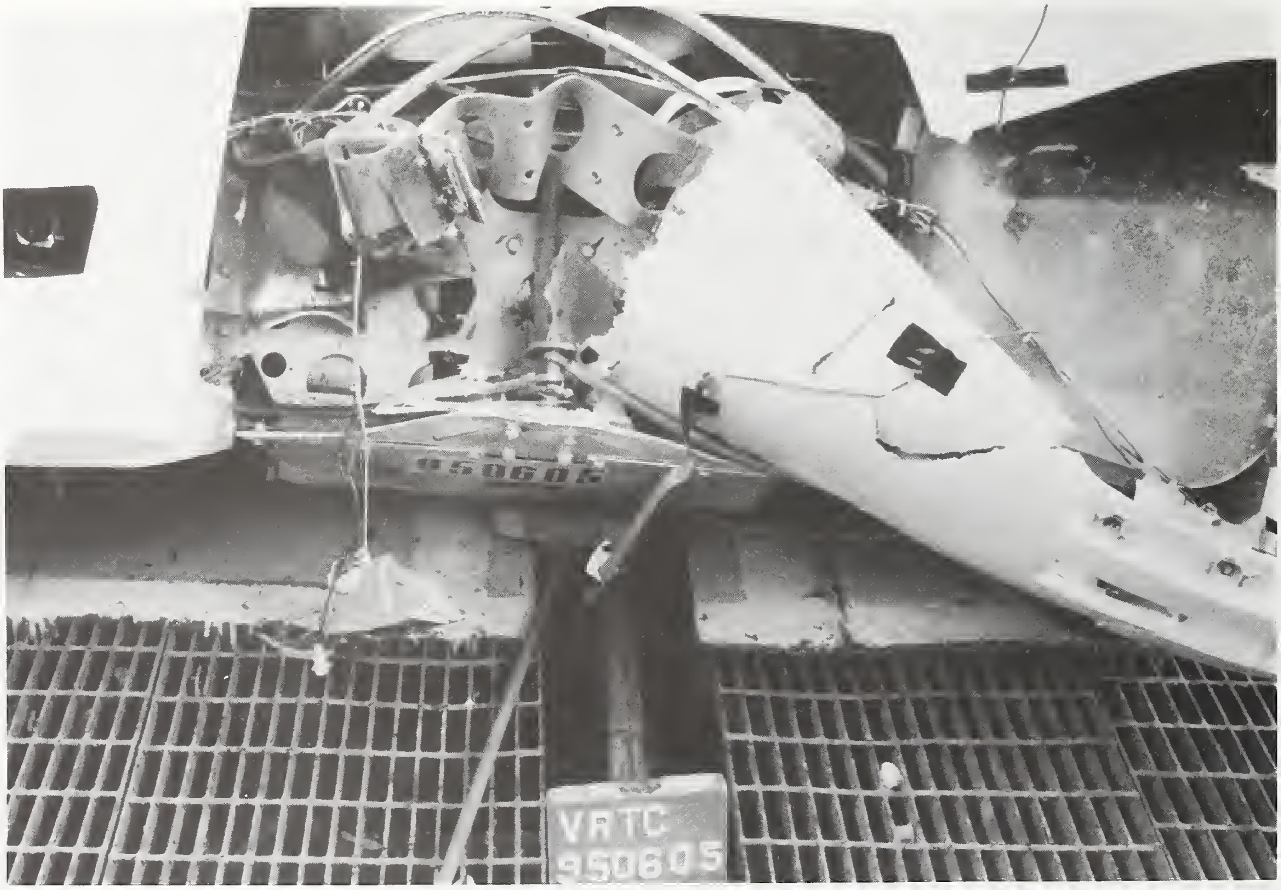

Figure A-15 Post-test Underhood View

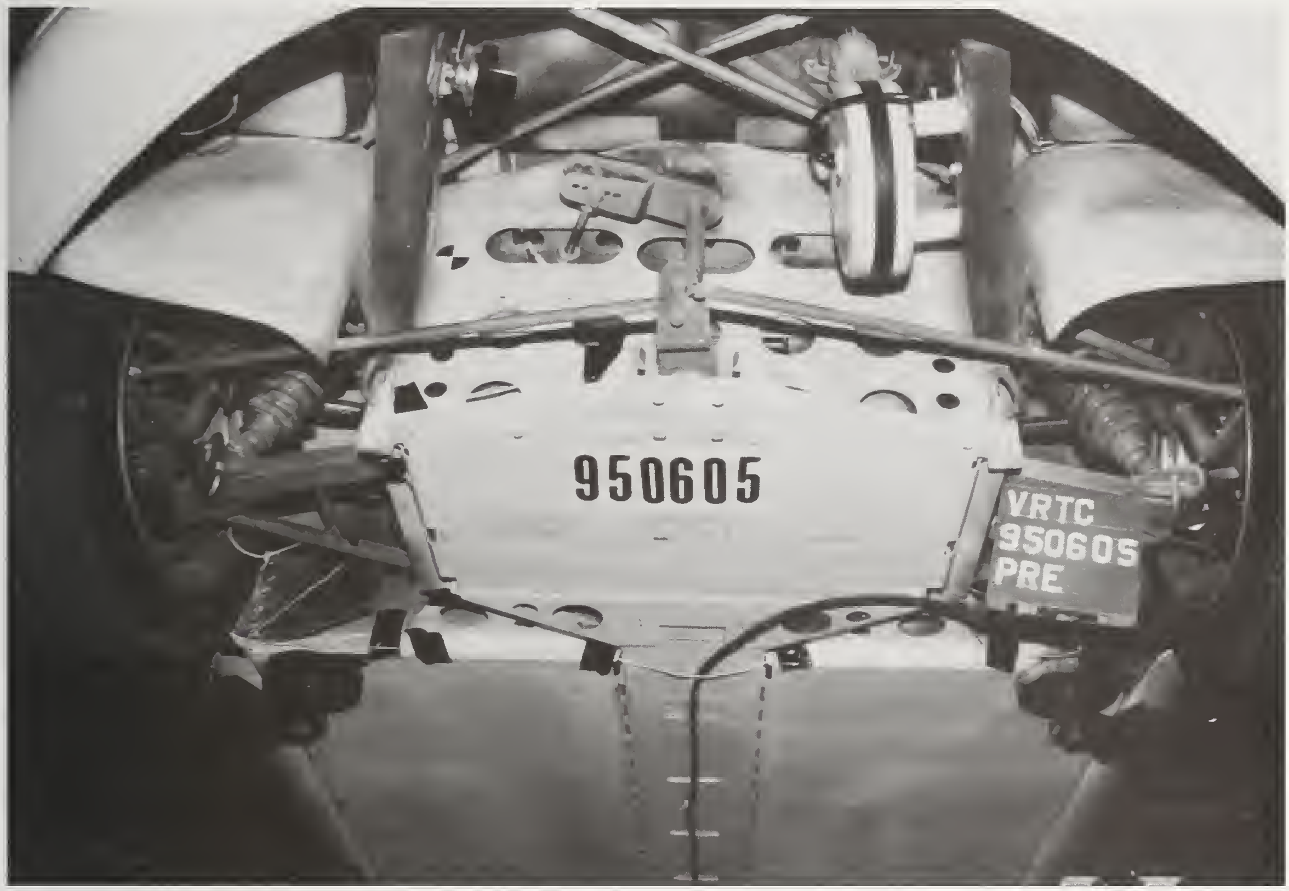

Figure A-16 Pre-test Front Underbody View

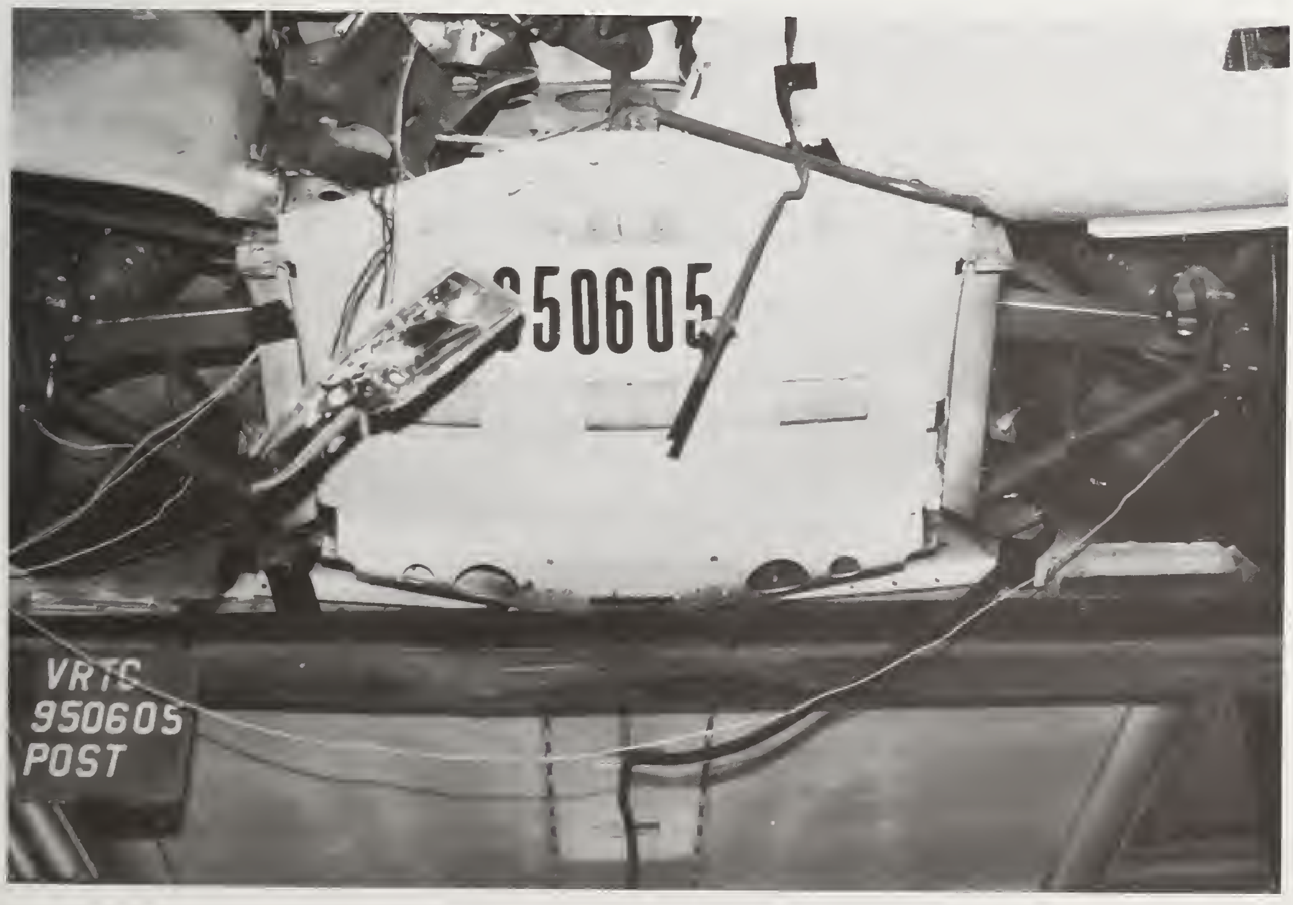

Figure A-17 Post-test Front Underbody View

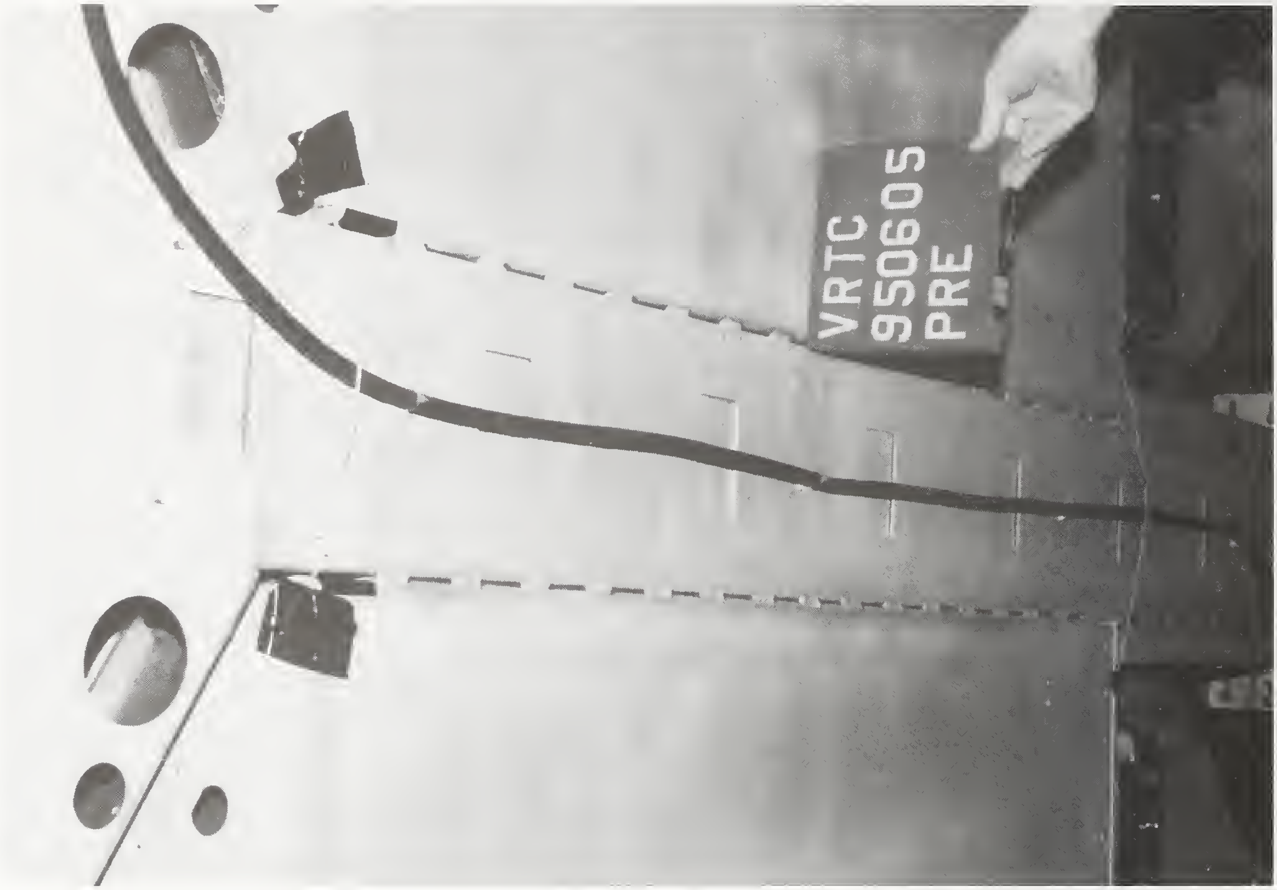

Figure A-18 Pre-test Mid Underbody View

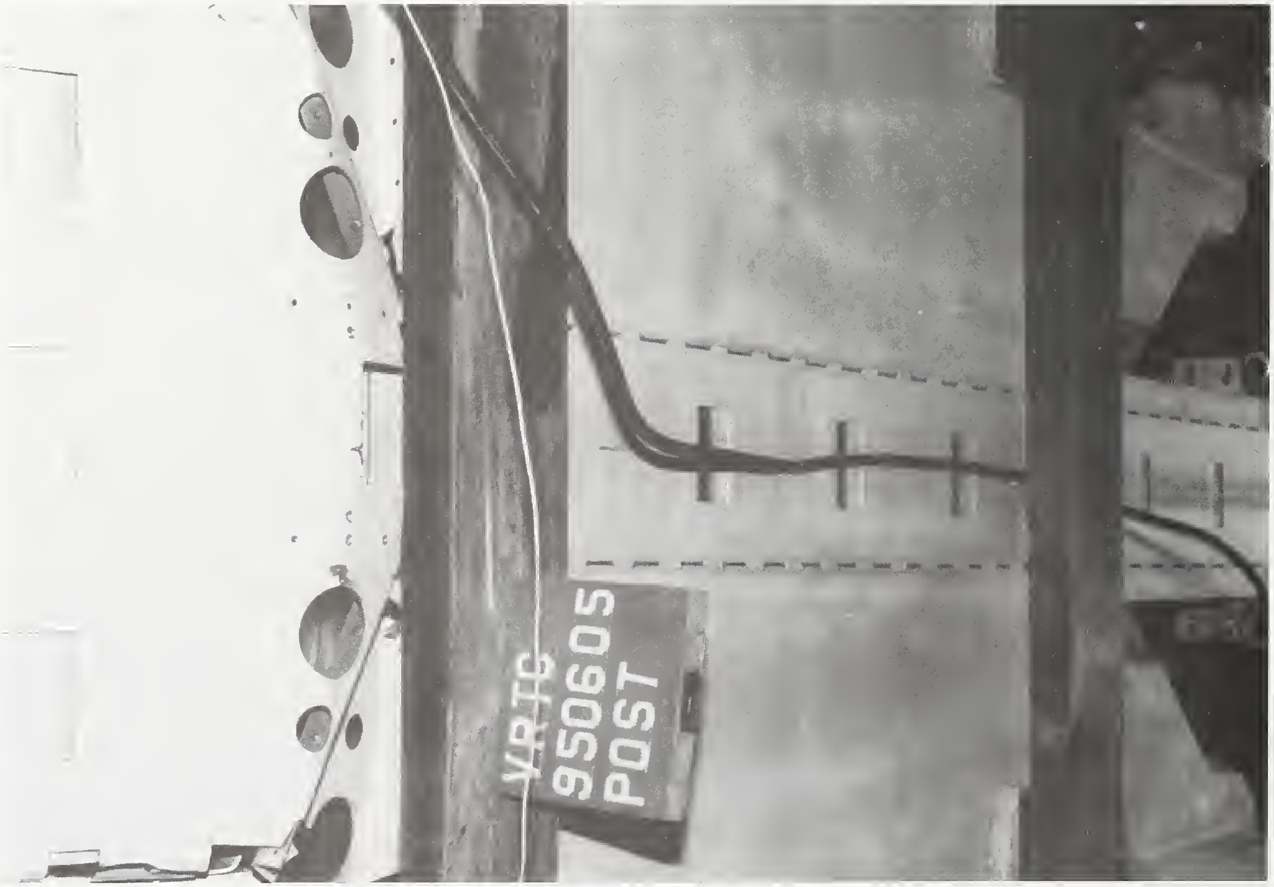

Figure A-19 Post-test Mid Underbody View

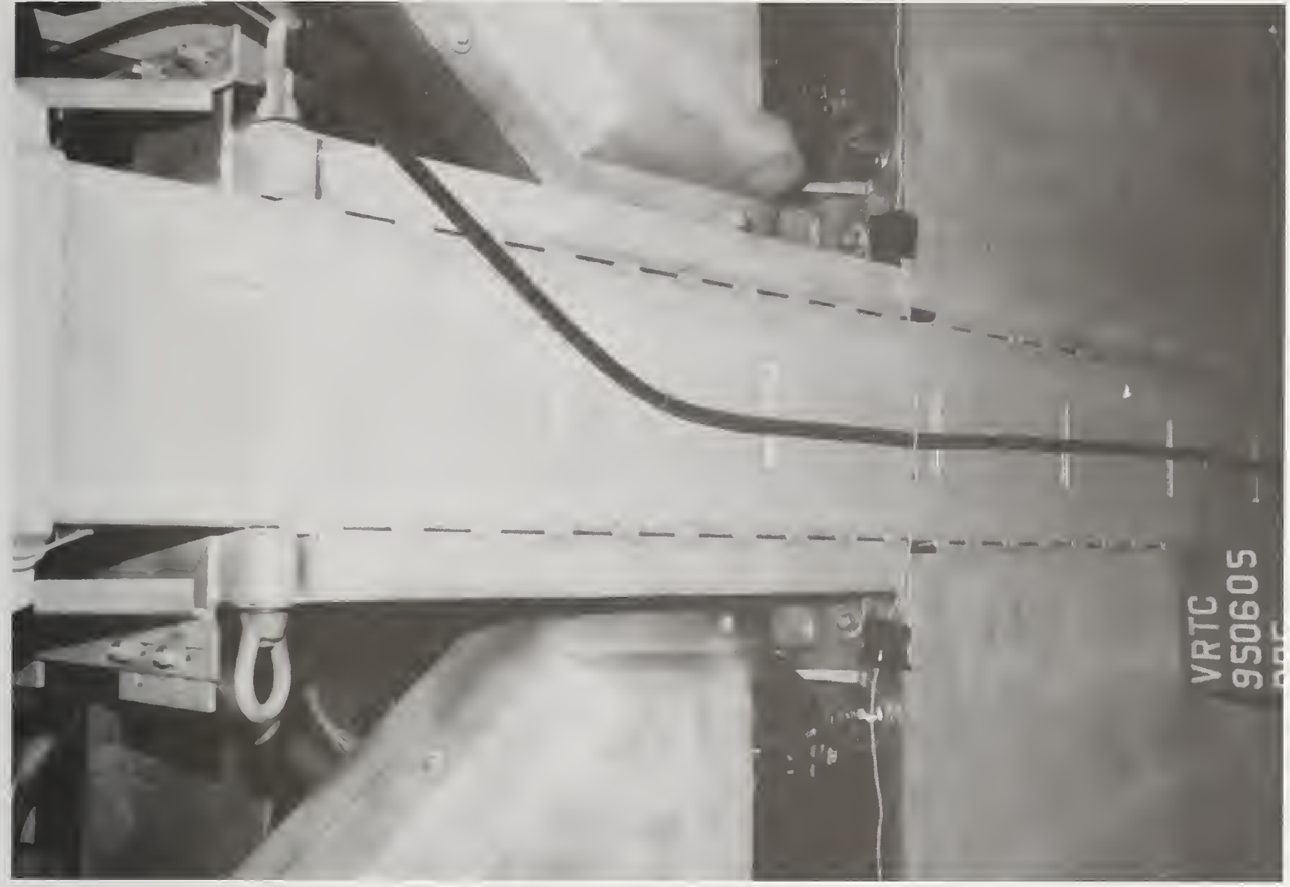

Figure A-20 Pre-test Rear Underbody - View 1

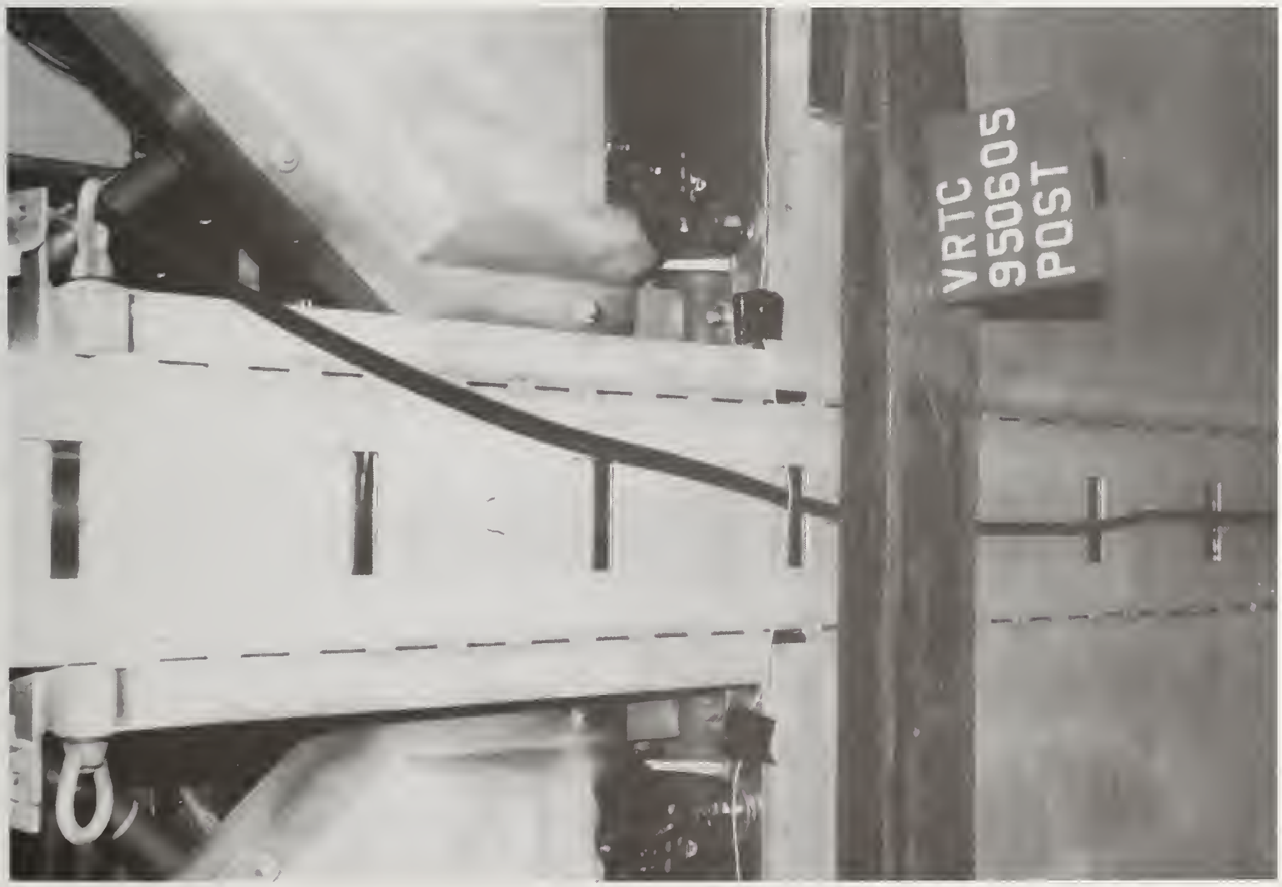

Figure A-21 Post-test Rear Underbody - View 1

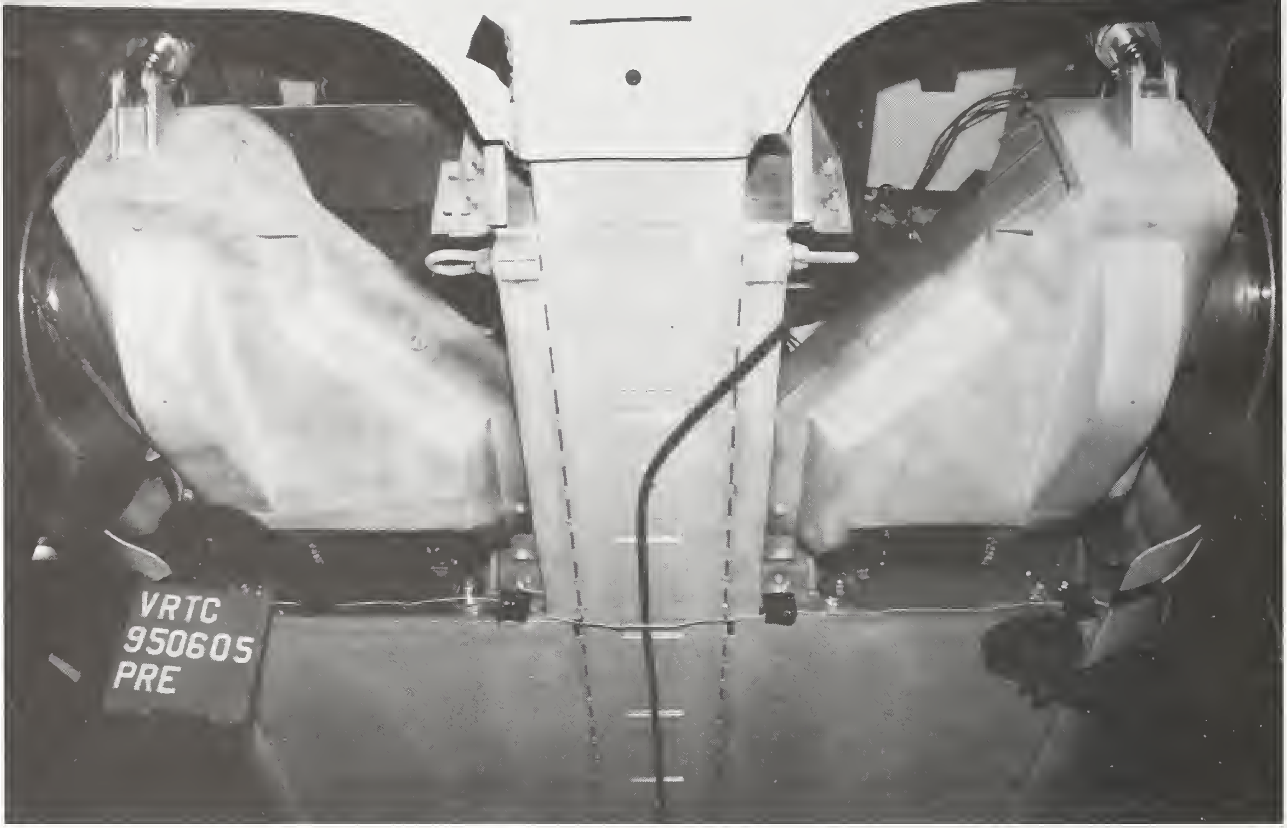

Figure A-22 Pre-test Rear Underbody - View 2

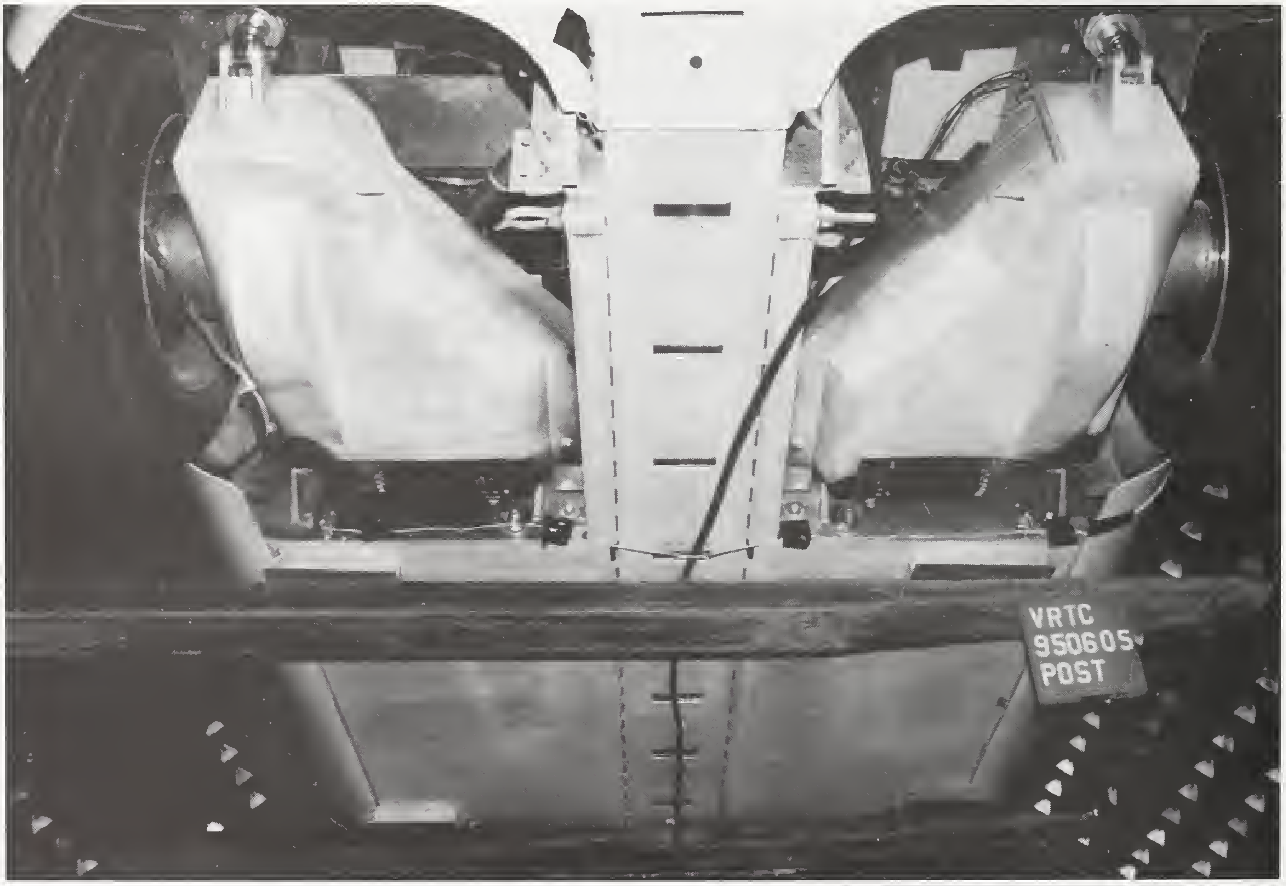

Figure A-23 Post-test Rear Underbody - View 2

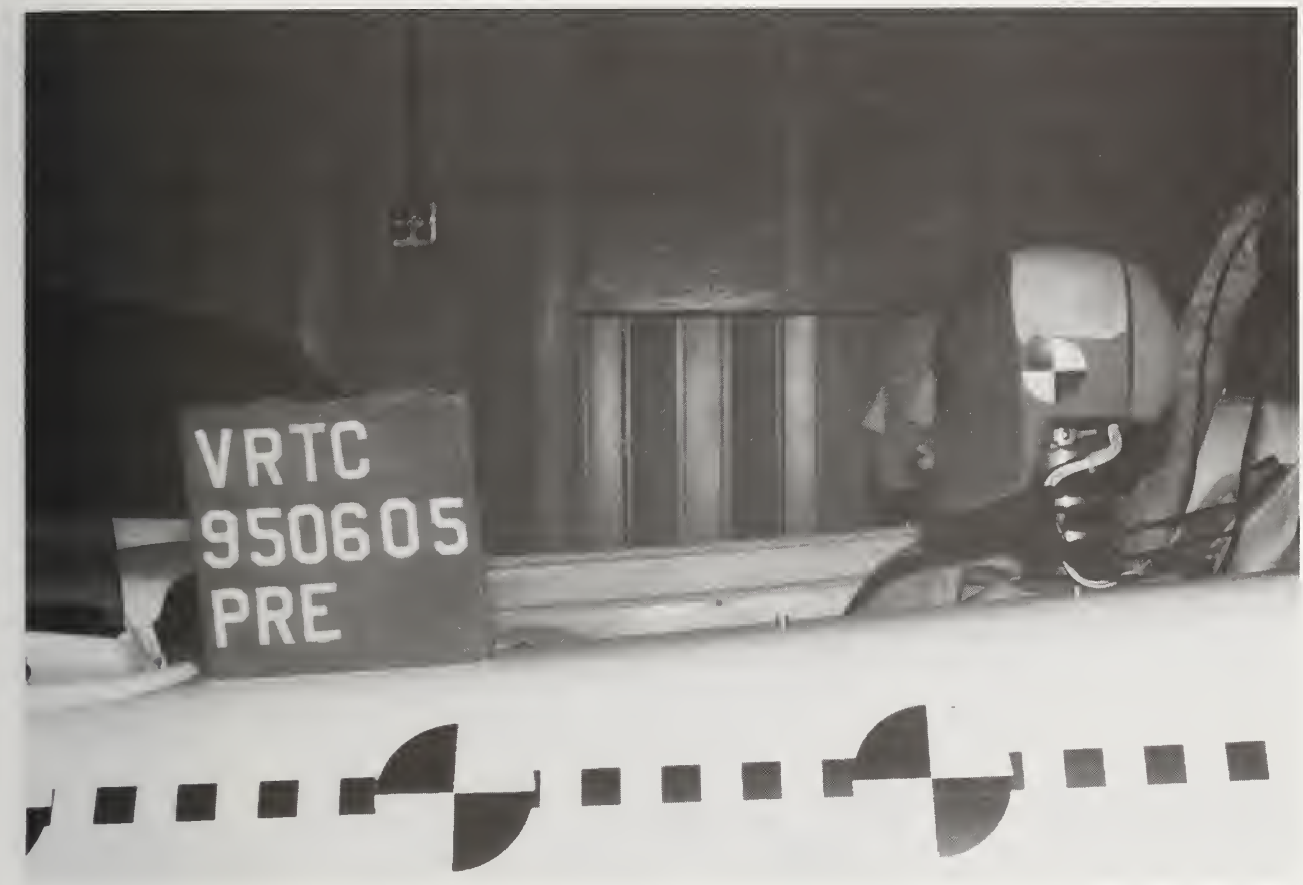

Figure A-24 Pre-test Driver Dummy Position View

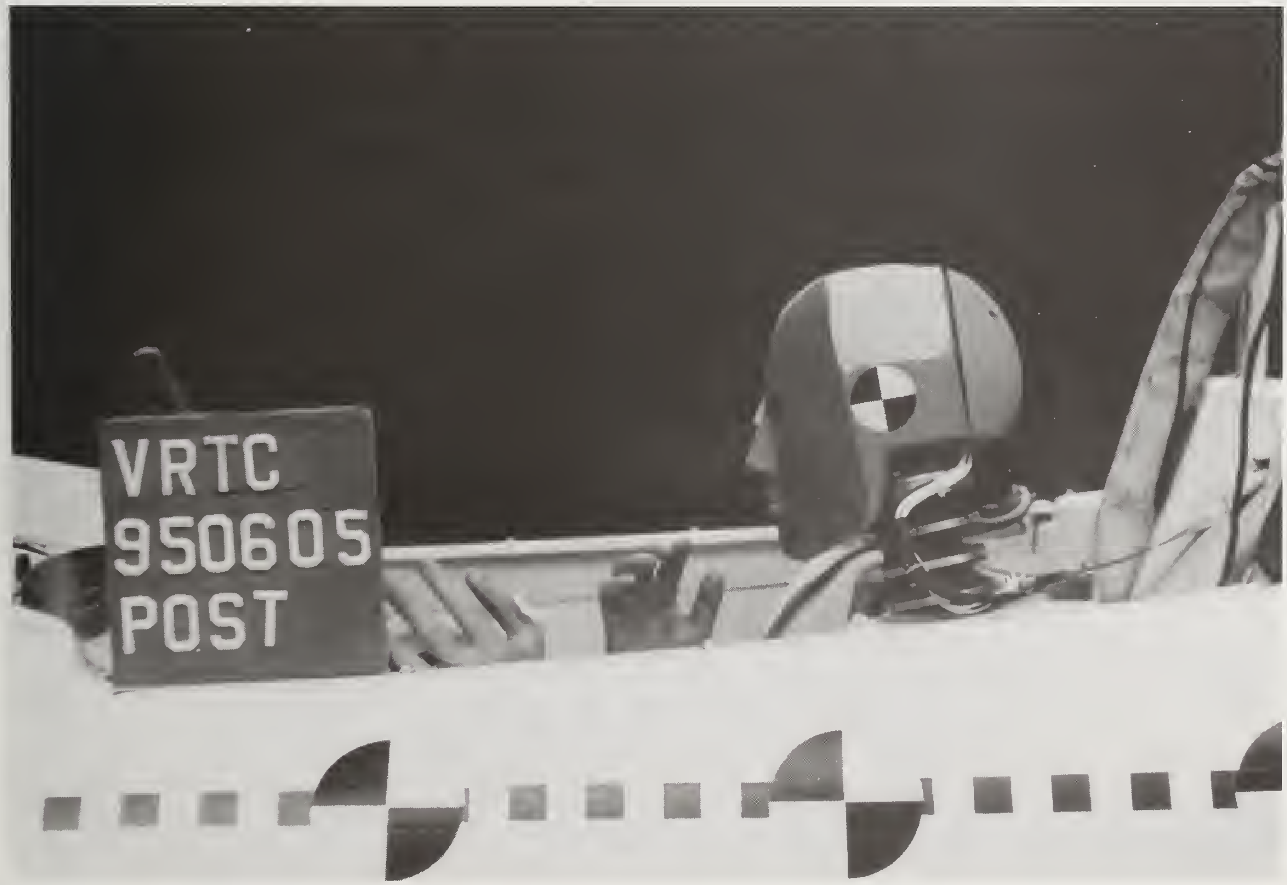

Figure A-25 Post-test Driver Dummy Position View

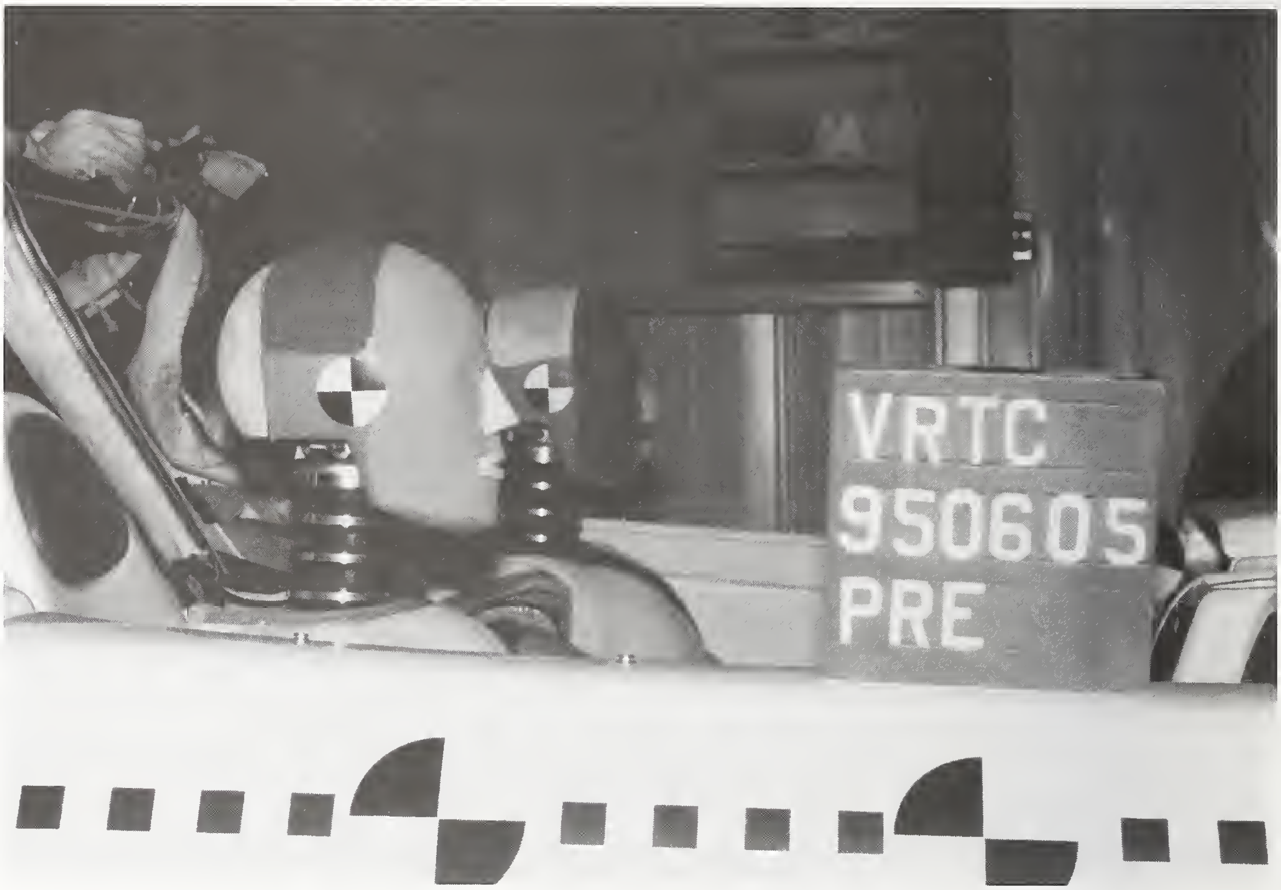

Figure A-26 Pre-test Passenger Dummy Position View

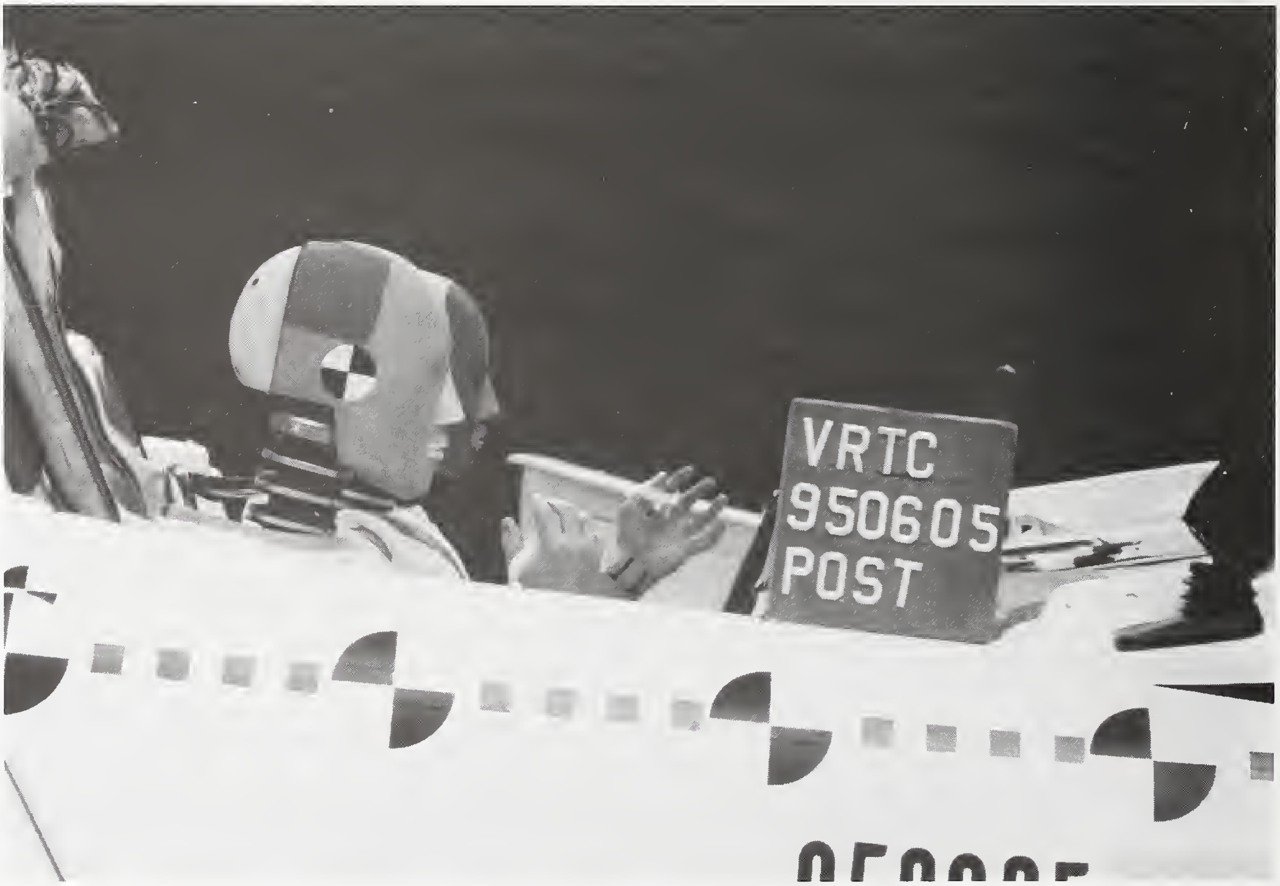

Figure A-27 Post-test Passenger Dummy Position View

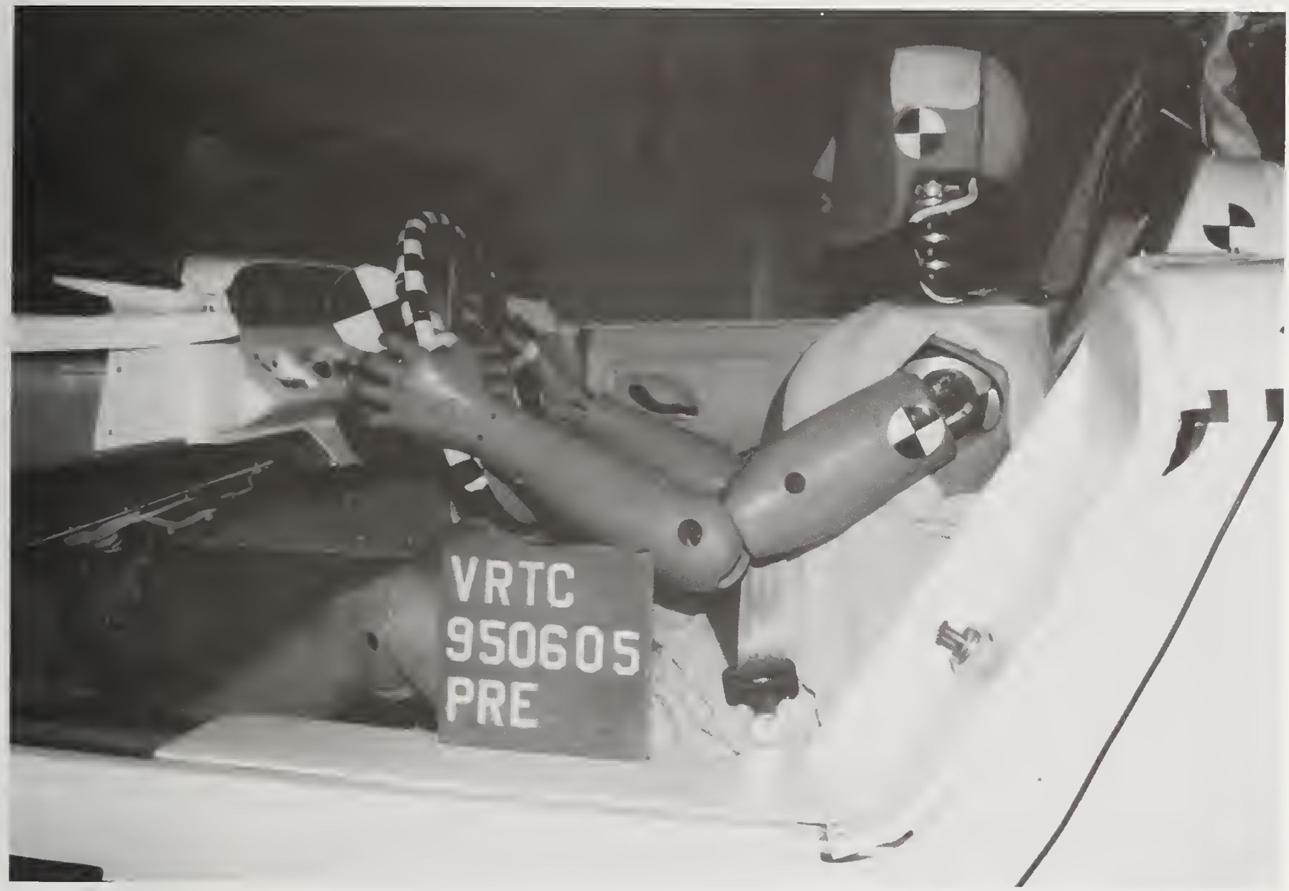

Figure A-28 Pre-test Driver Dummy and Vehicle Interior - View 1

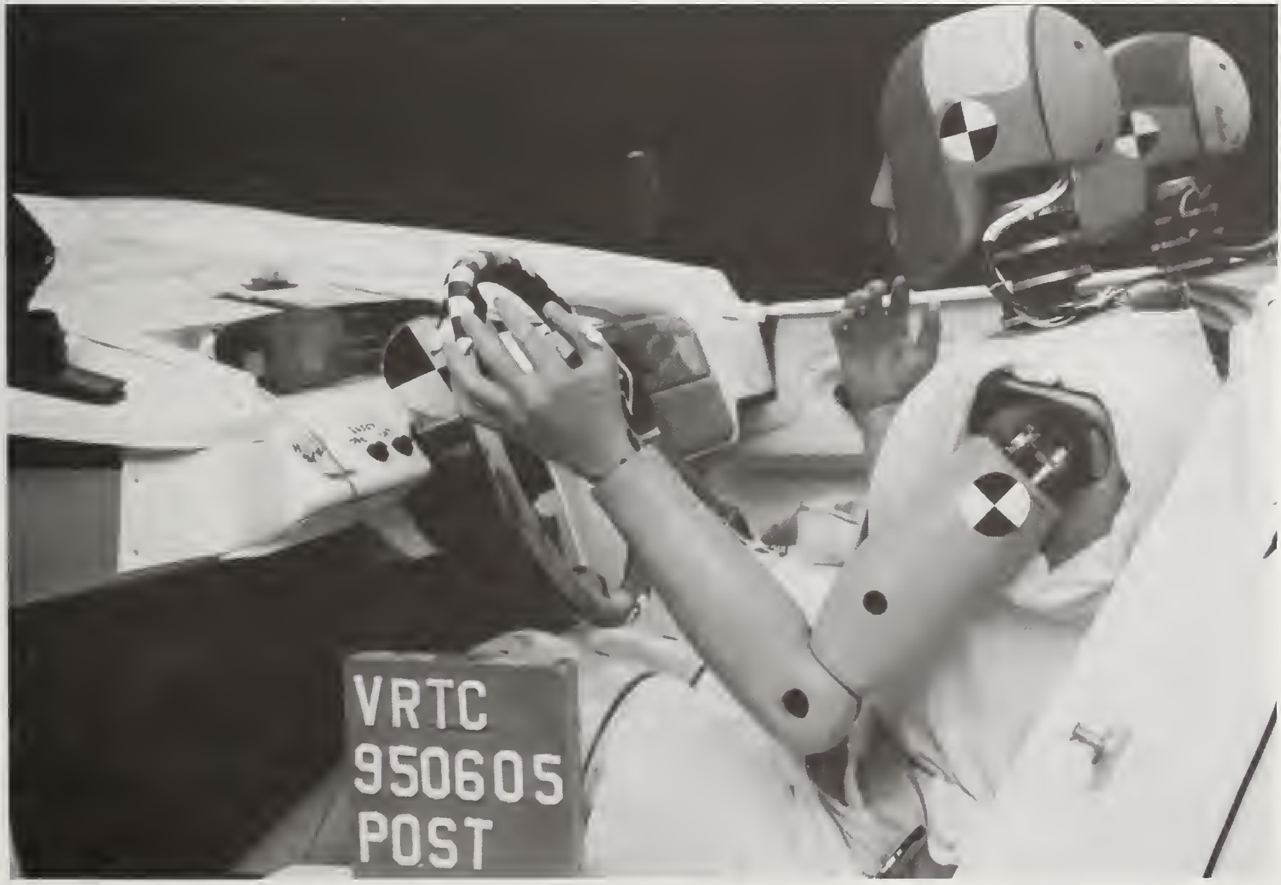

Figure A-29 Post-test Driver Dummy and Vehicle Interior - View 1

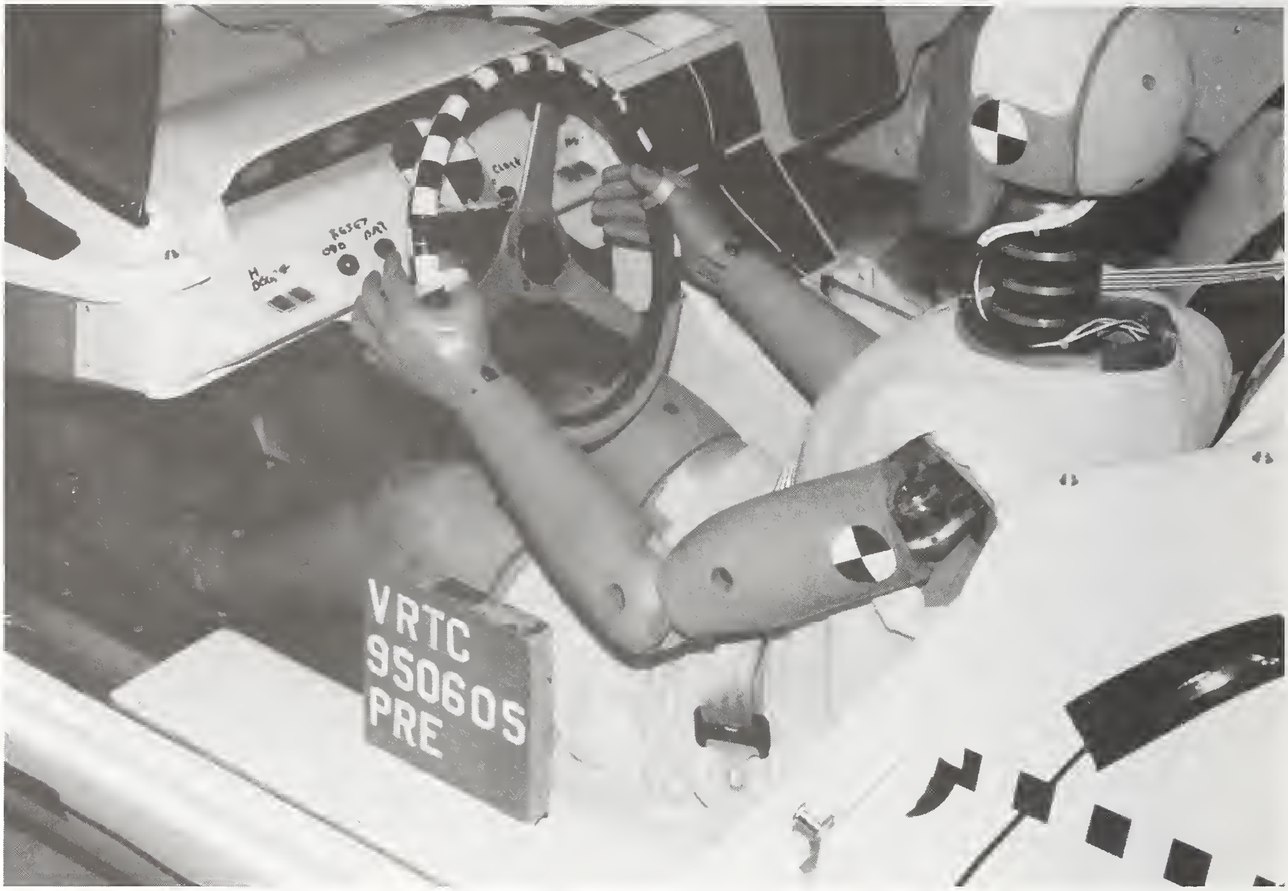

Figure A-30 Pre-test Driver Dummy and Vehicle Interior - View 2

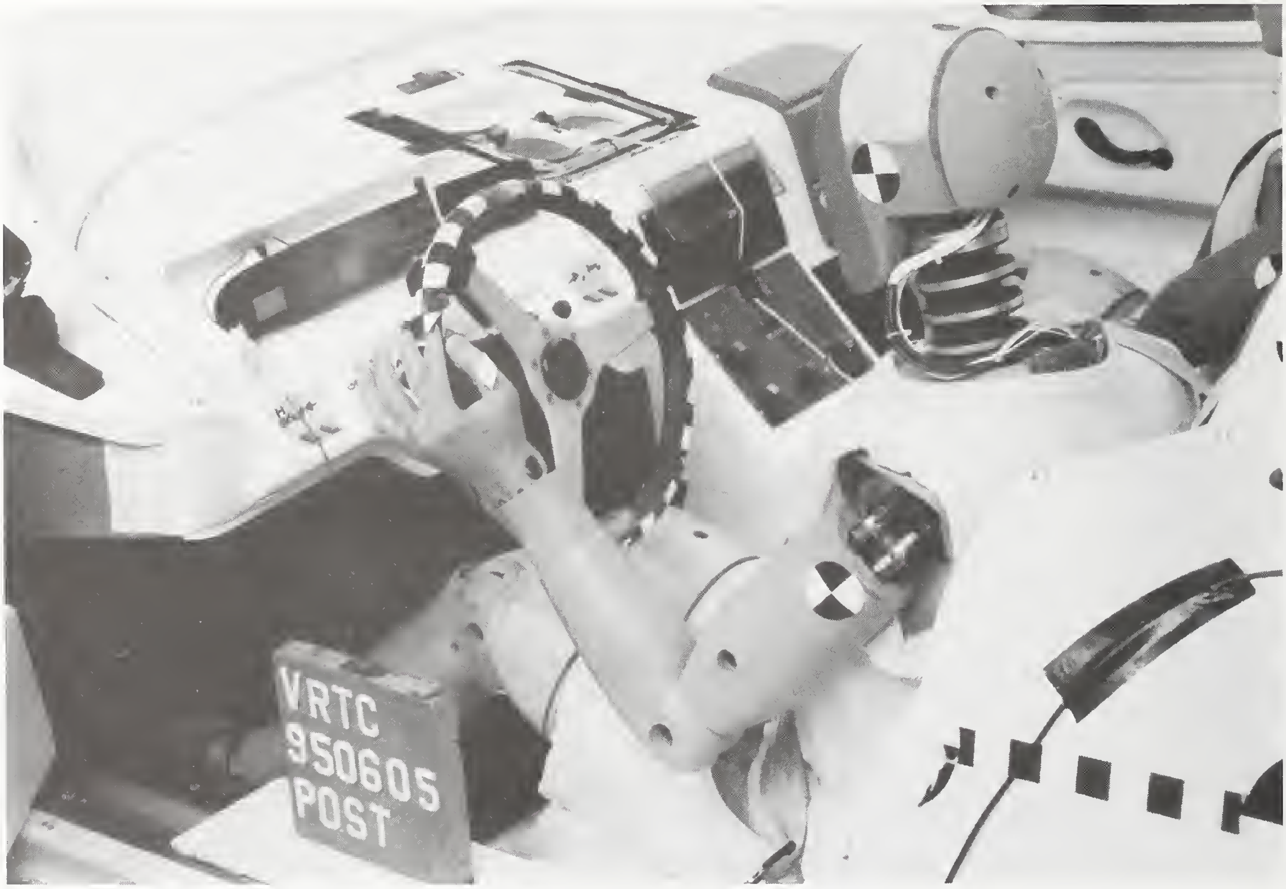

Figure A-31 Post-test Driver Dummy and Vehicle Interior - View 2

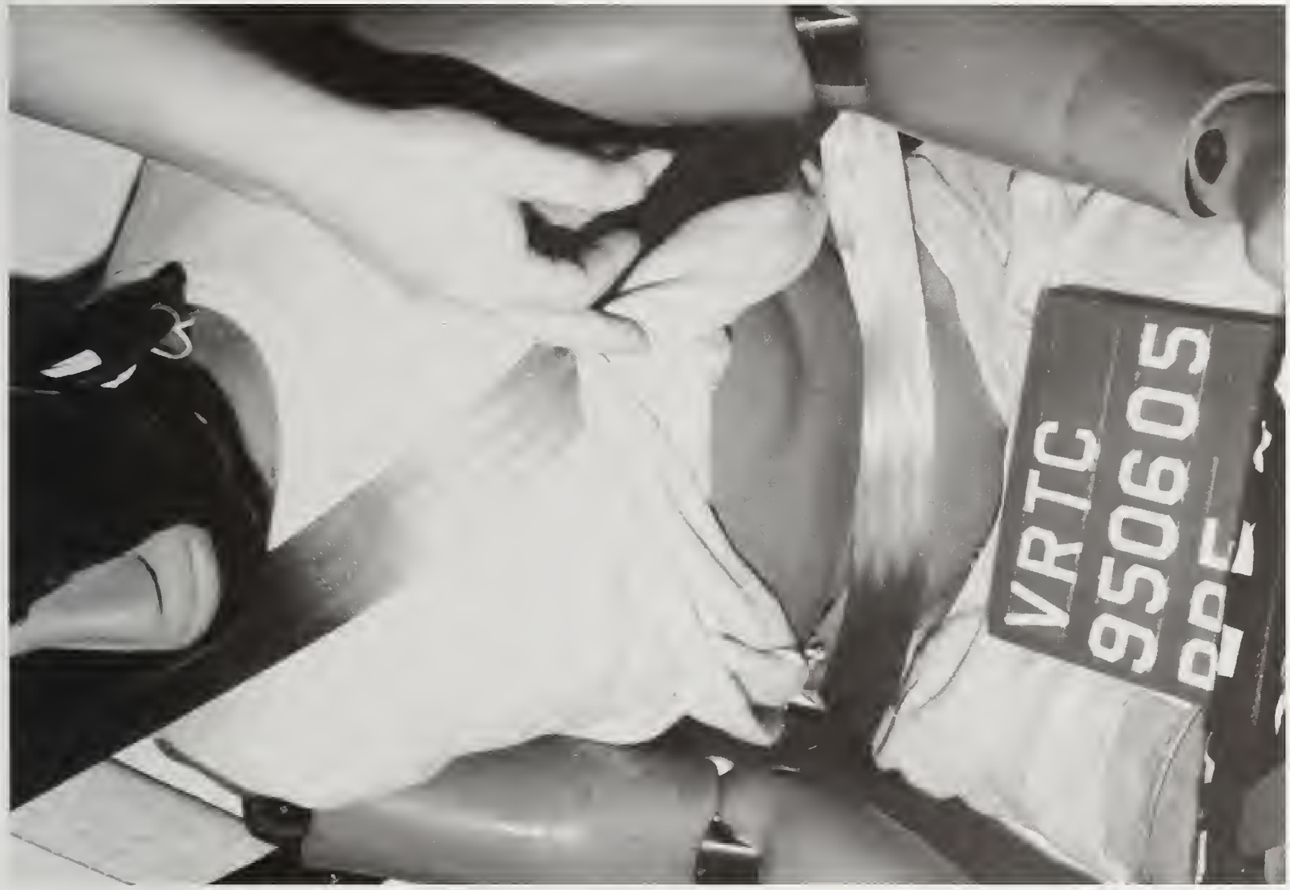

Figure A-32 Pre-test Driver Dummy Belt Position View

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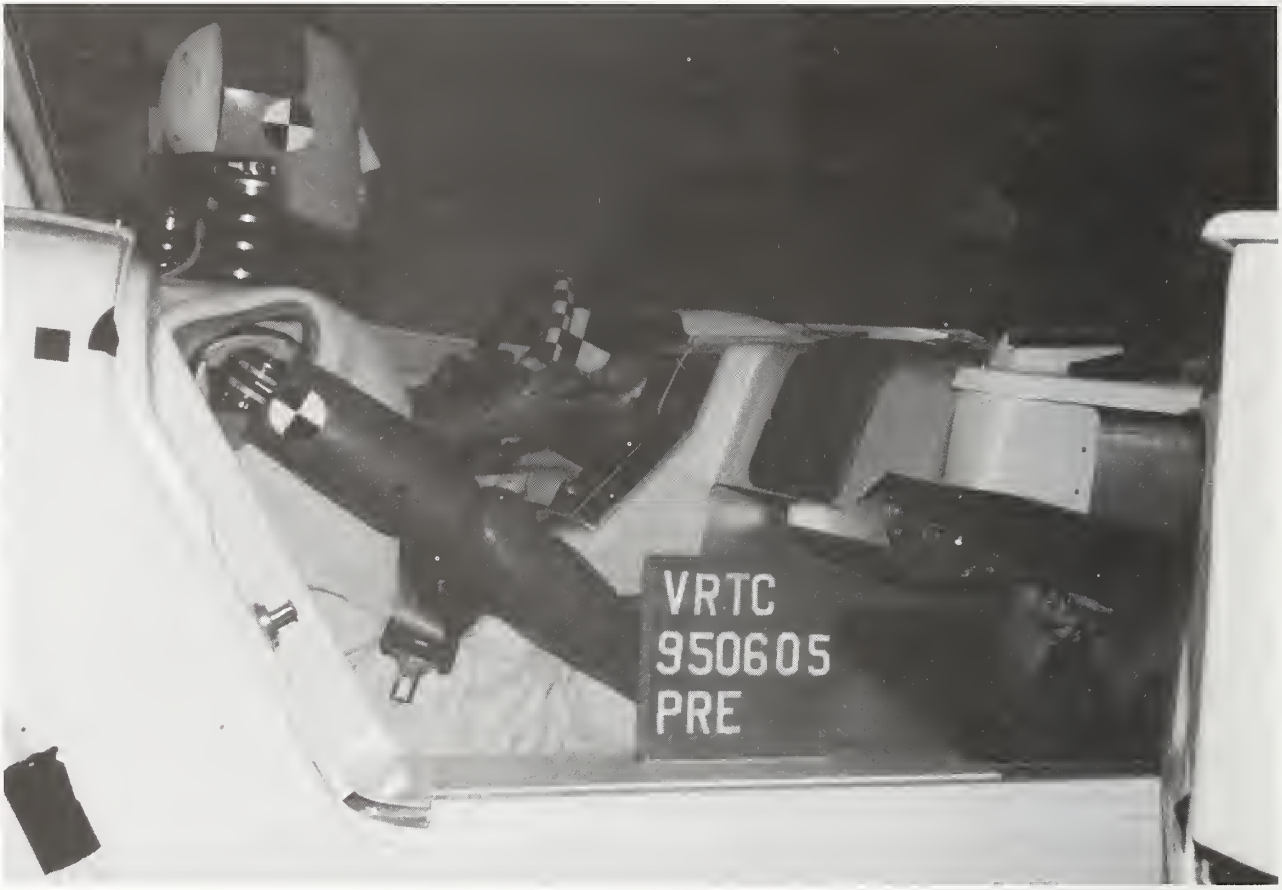

Figure A-33 Pre-test Passenger Dummy and Vehicle Interior - View 1

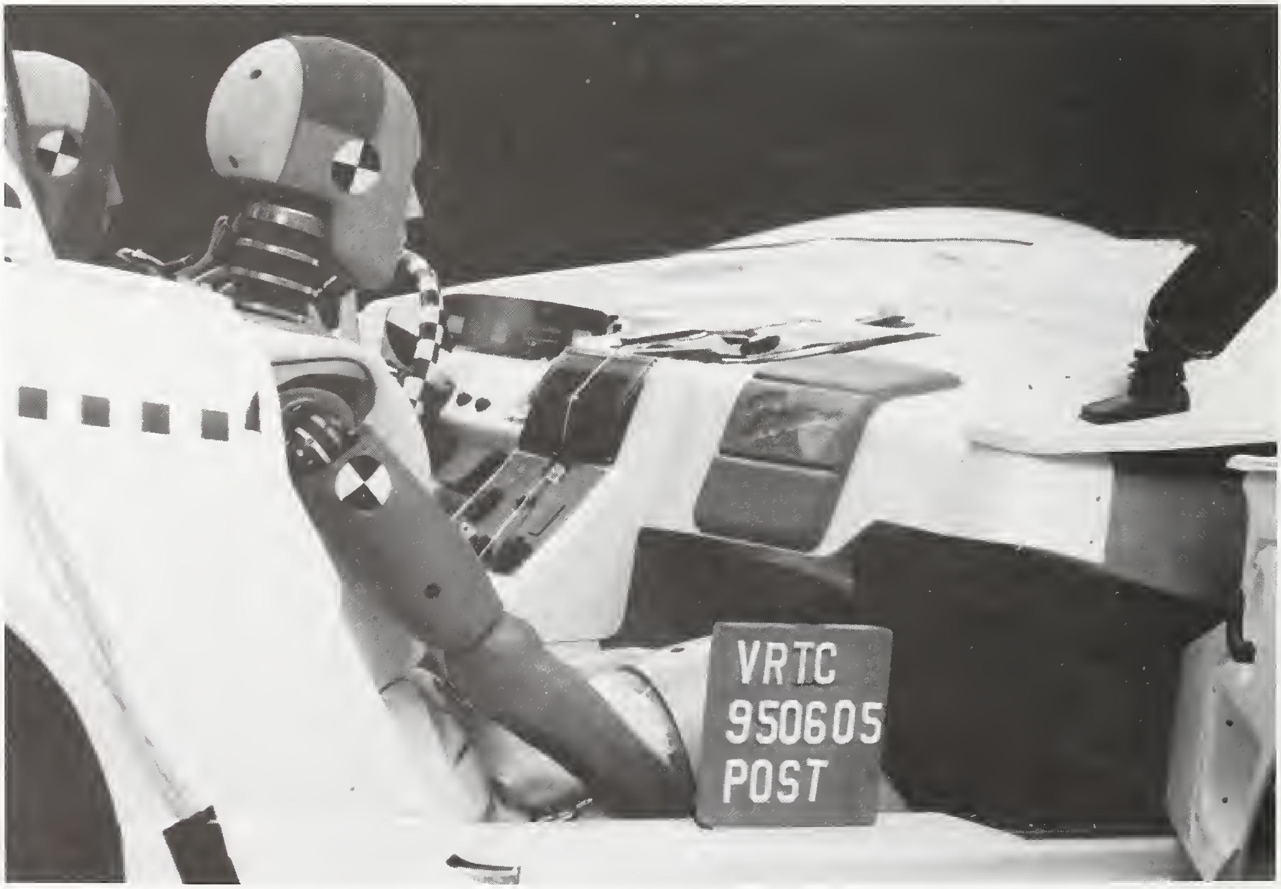

Figure A-34 Post-test Passenger Dummy and Vehicle Interior - View 1

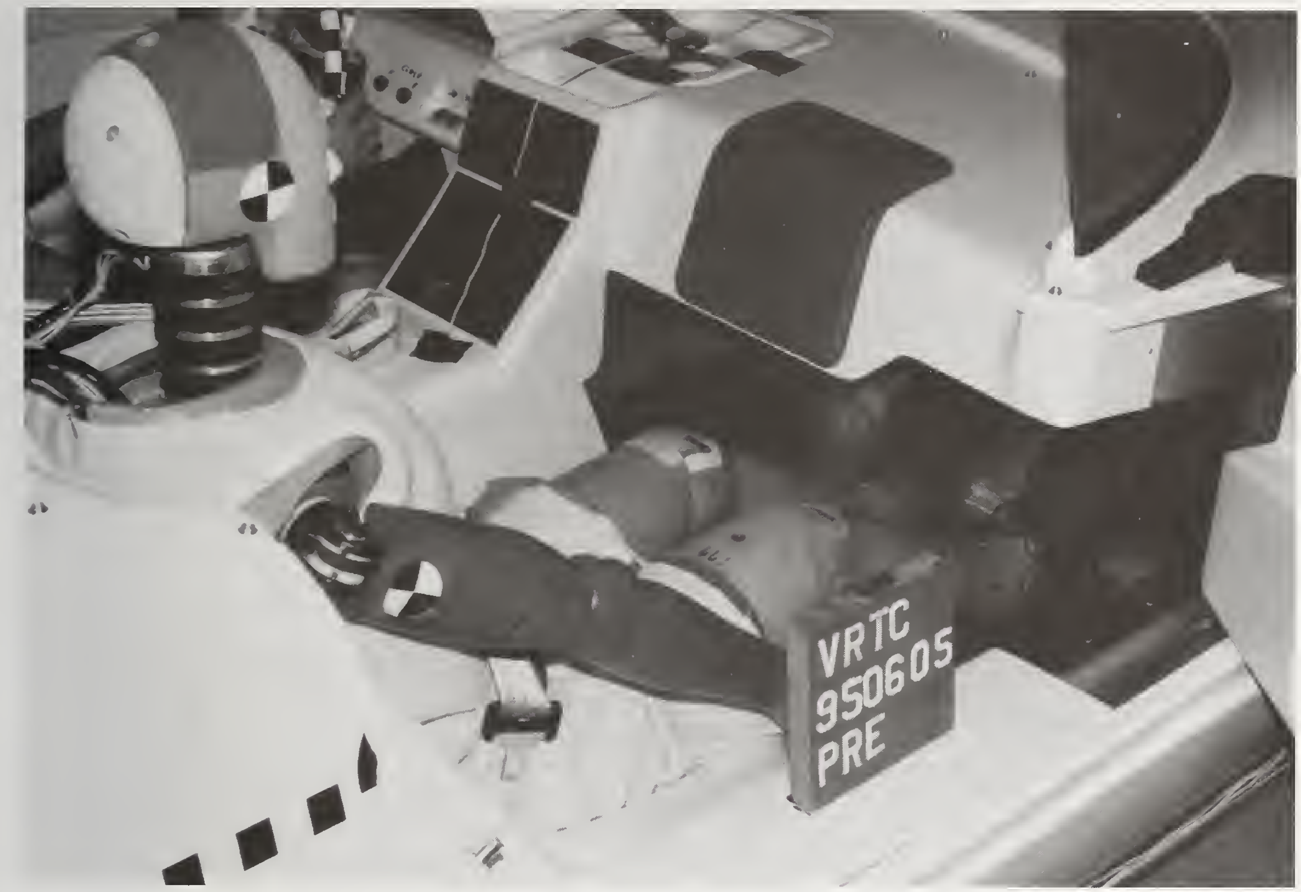

Figure A-35 Pre-test Passenger Dummy and Vehicle Interior - View 2

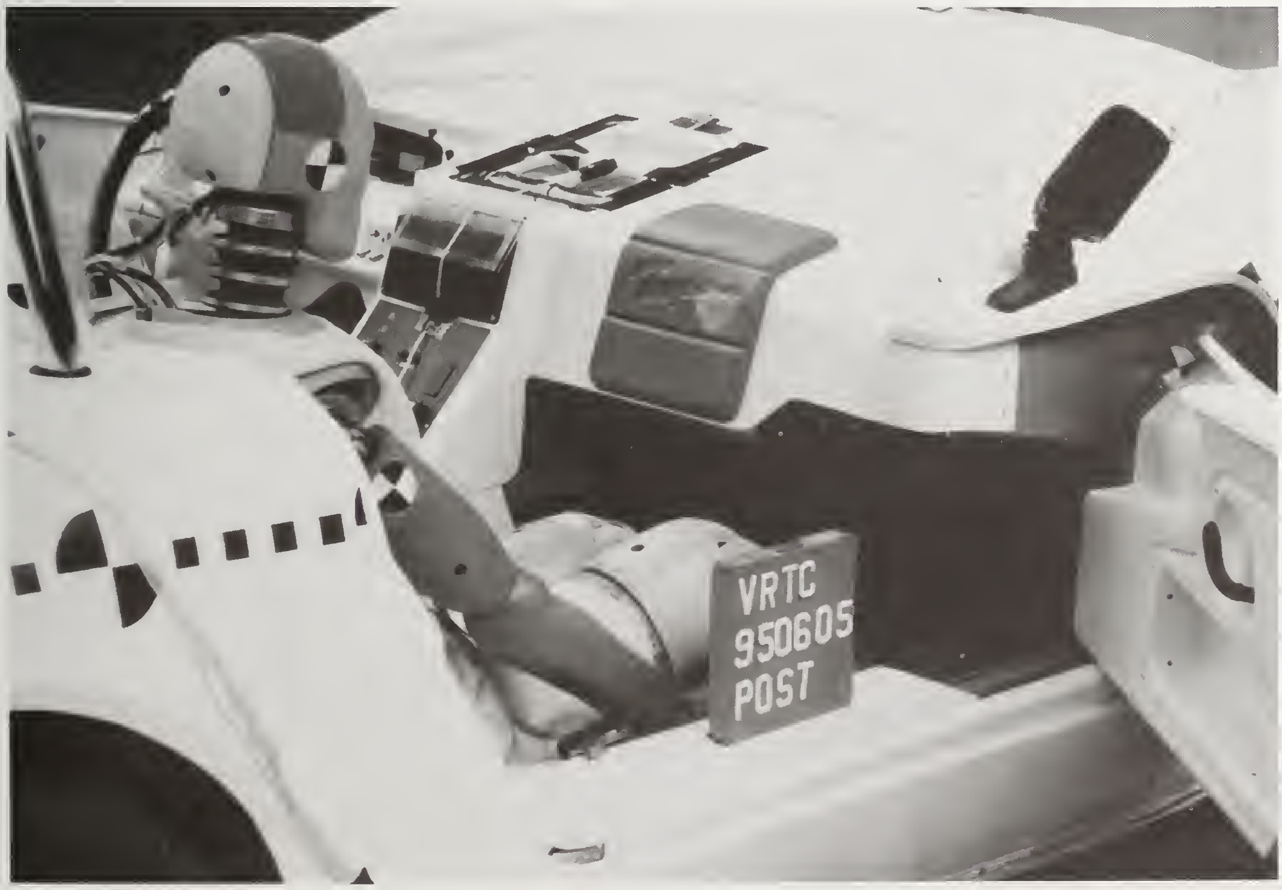

Figure A-36 Post-test Passenger Dummy and Vehicle Interior - View 2

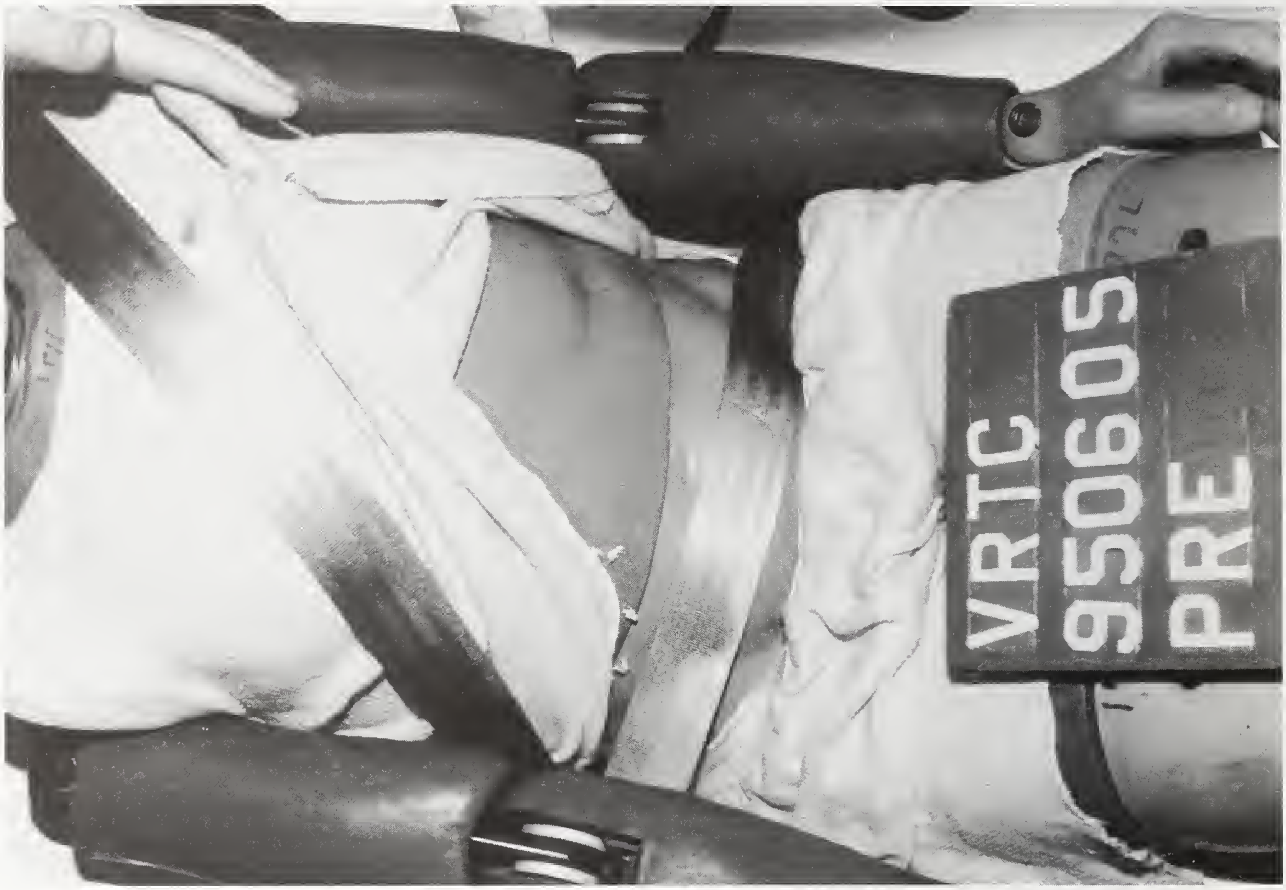

Figure A-37 Pre-test Passenger Dummy Belt Position View

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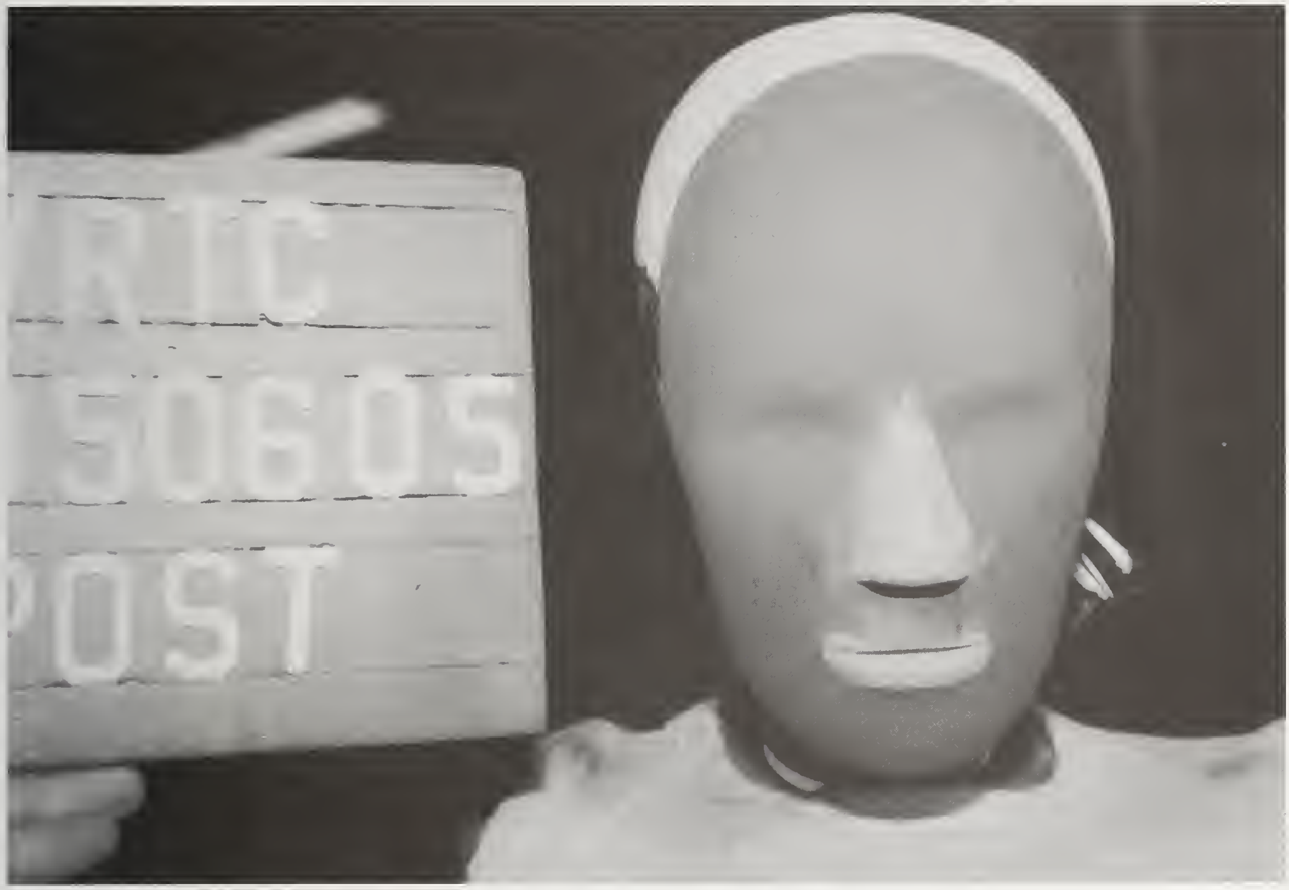

Figure A-38 Post-test Driver Dummy Head Contact - View 1

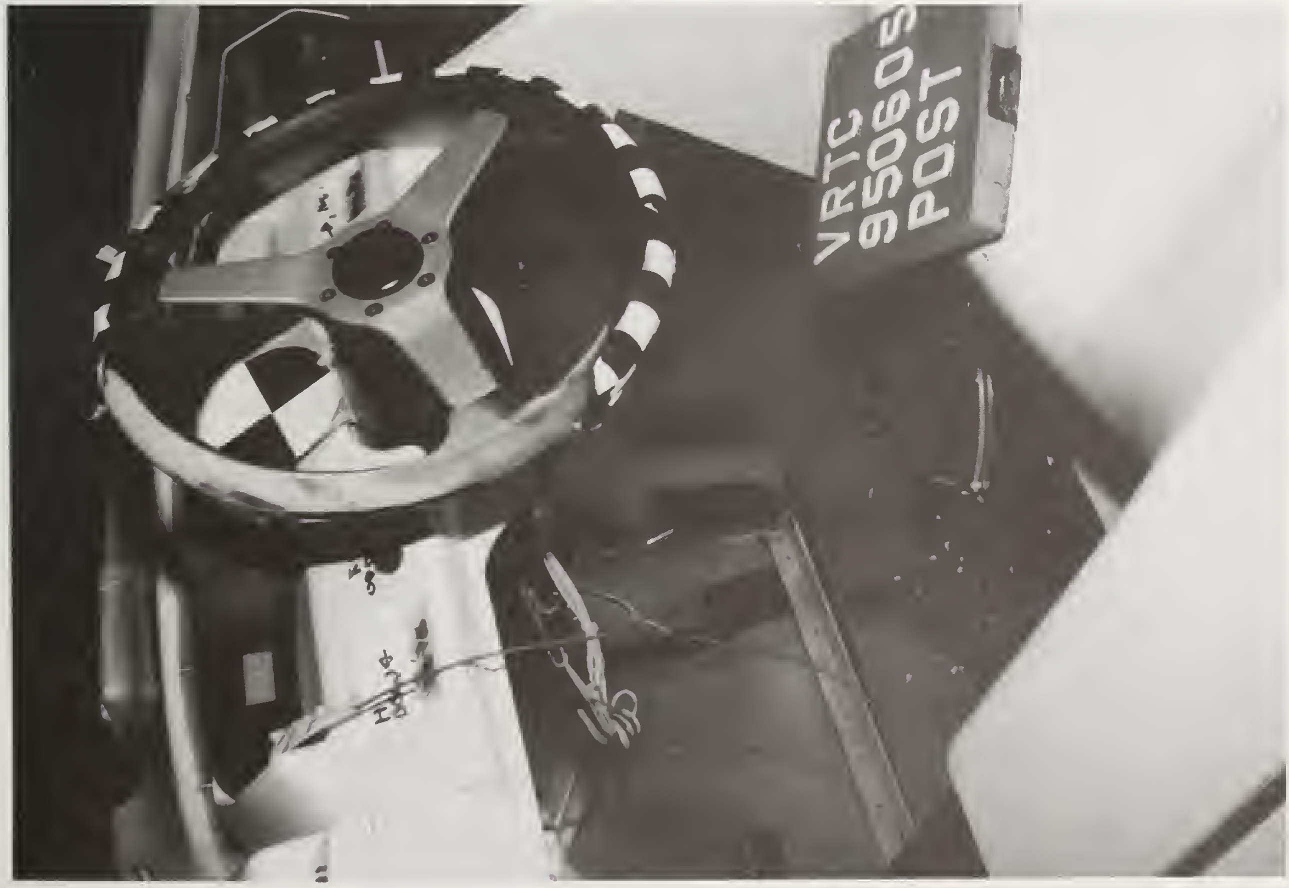

Figure A-39 Post-test Driver Dummy Head Contact - View 2

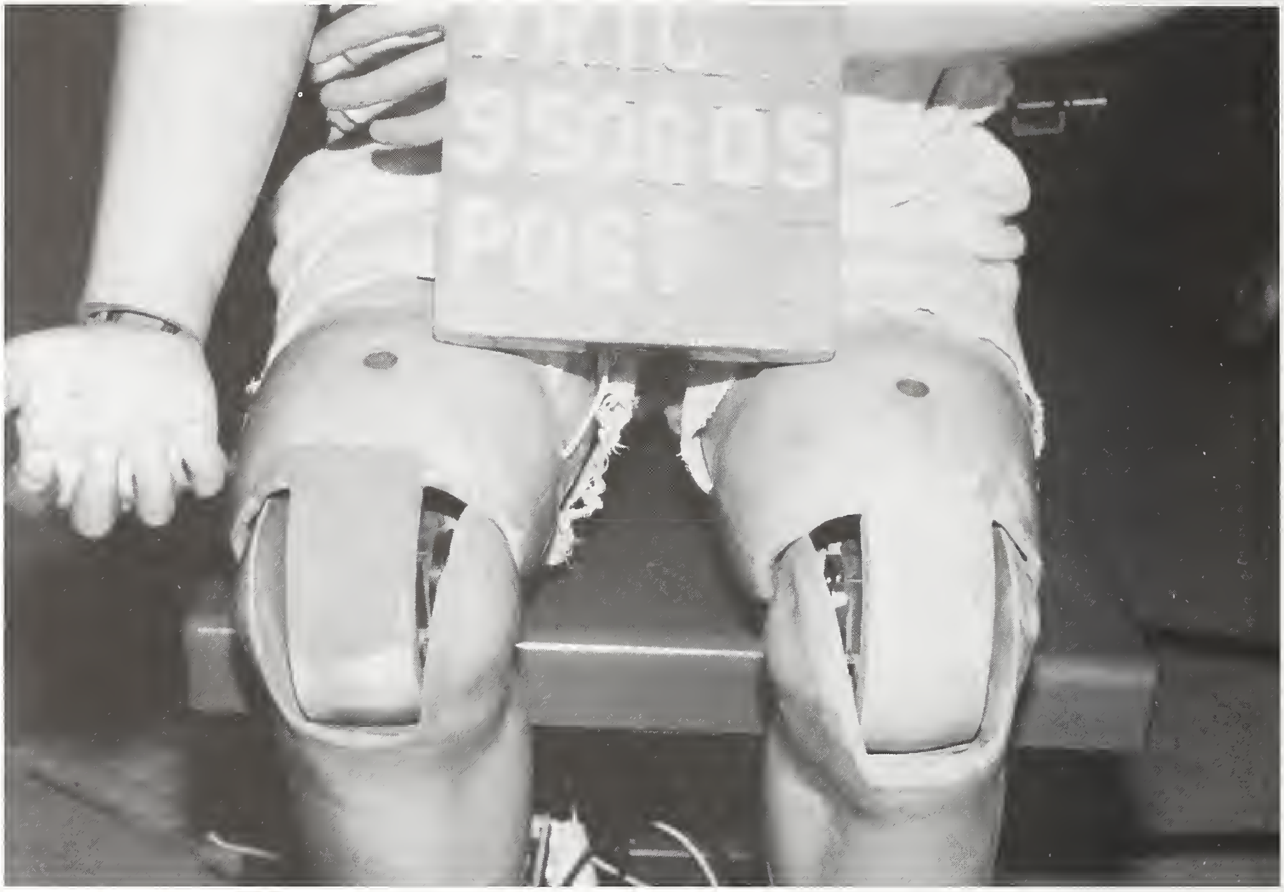

Figure A-40 Post-test Driver Dummy Knee Contact View

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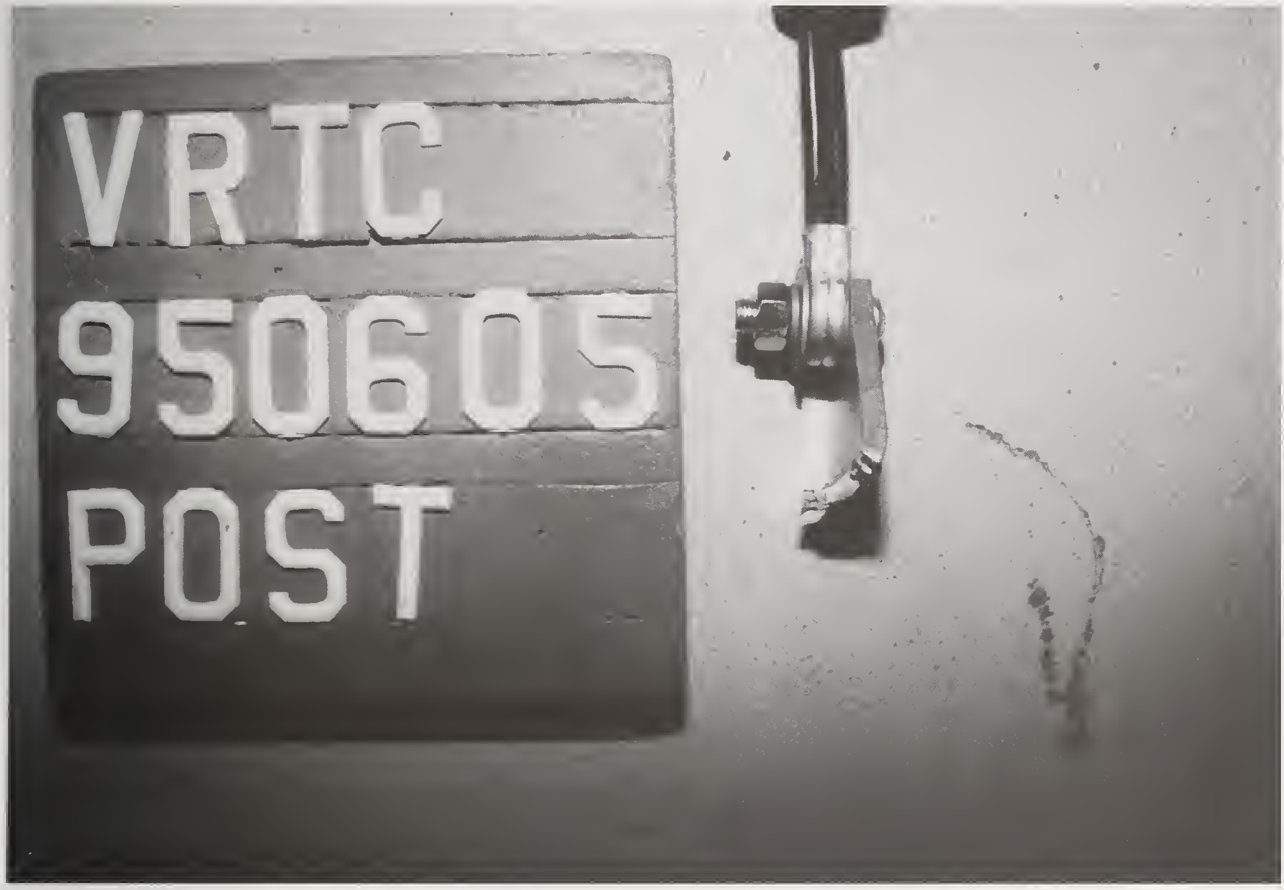


Figure A-41 Post-test Driver Dummy Belt Latch Anchor - View 1

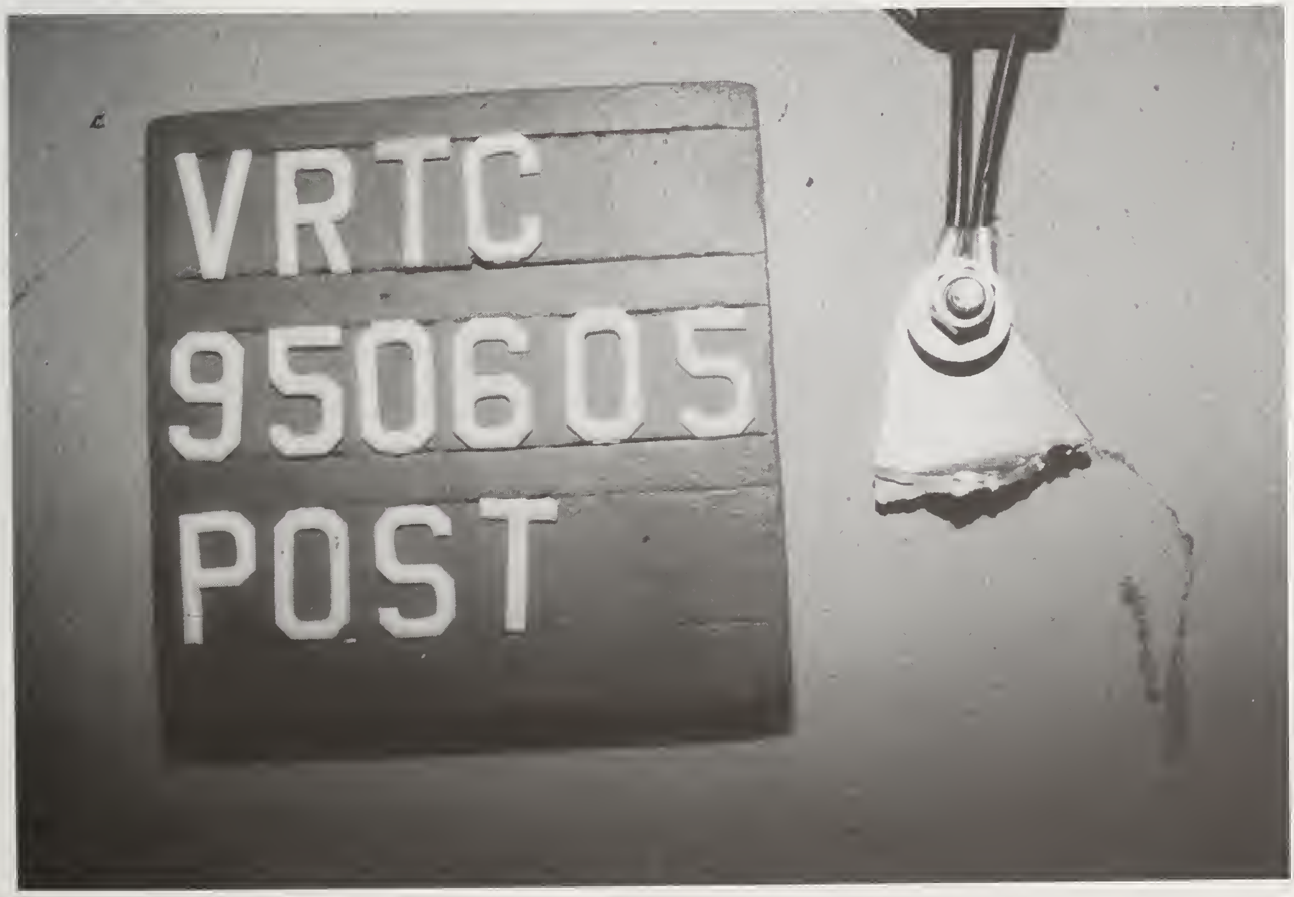


Figure A-42 Post-test Driver Dummy Belt Latch Anchor - View 2

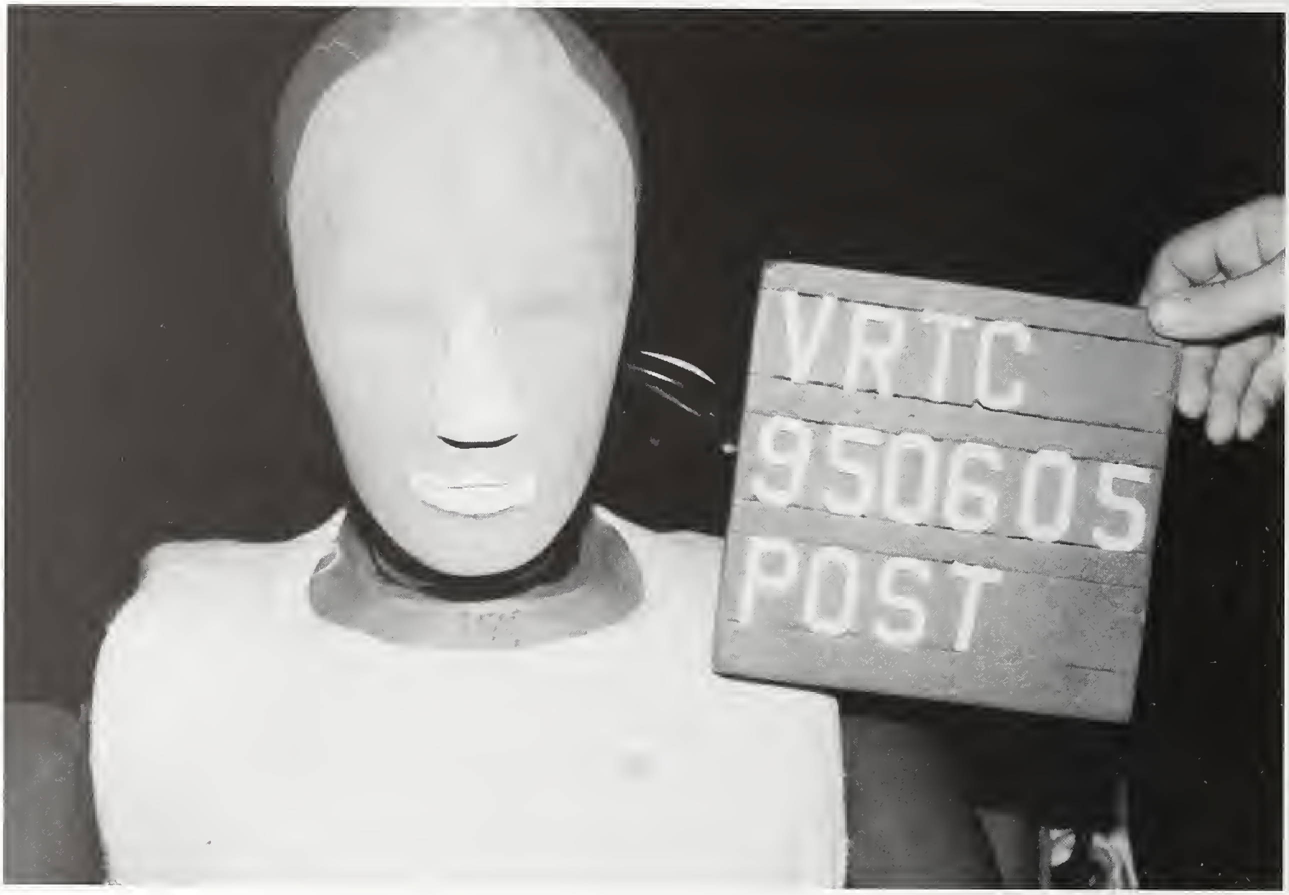


Figure A-43 Post-test Passenger Dummy Head Contact - View 1

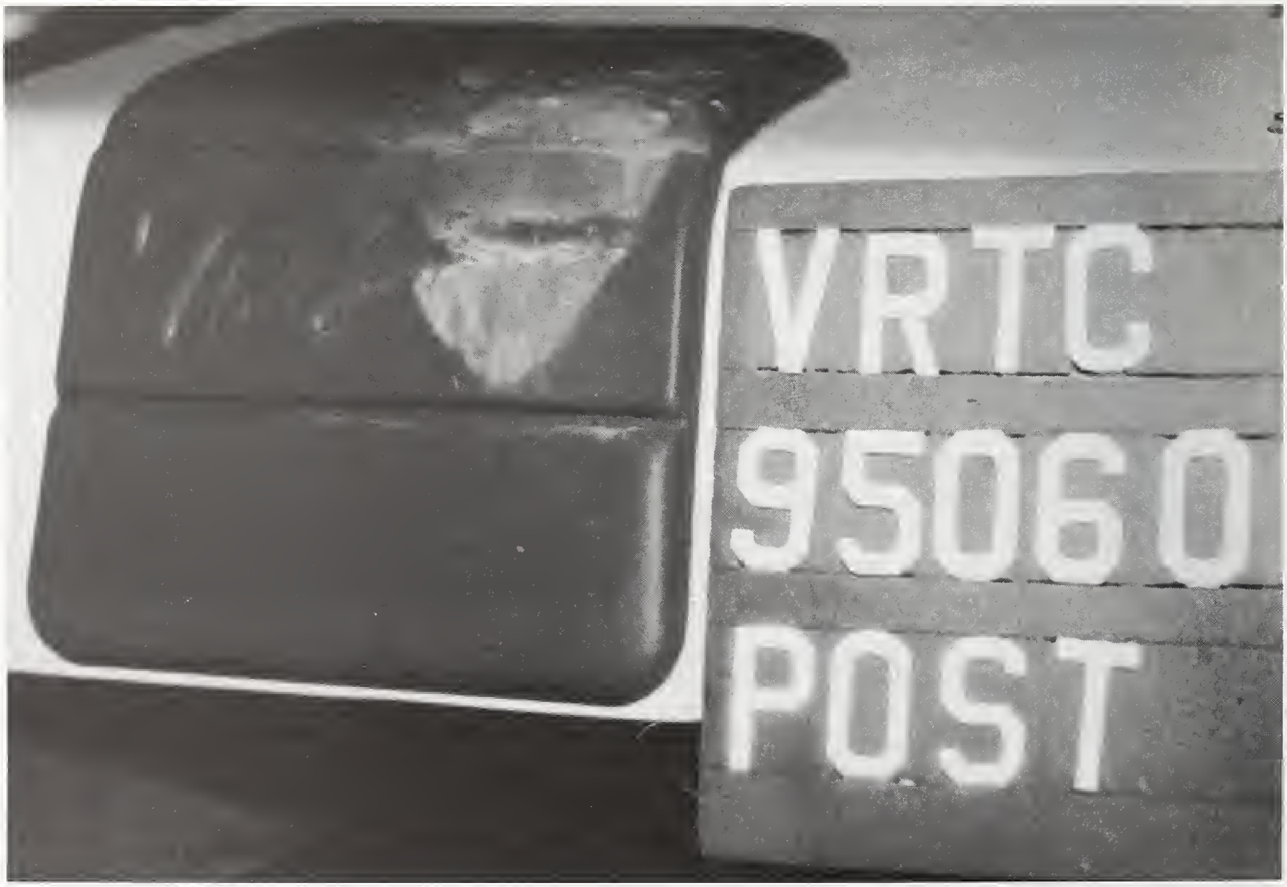


Figure A-44 Post-test Passenger Dummy Head Contact - View 2

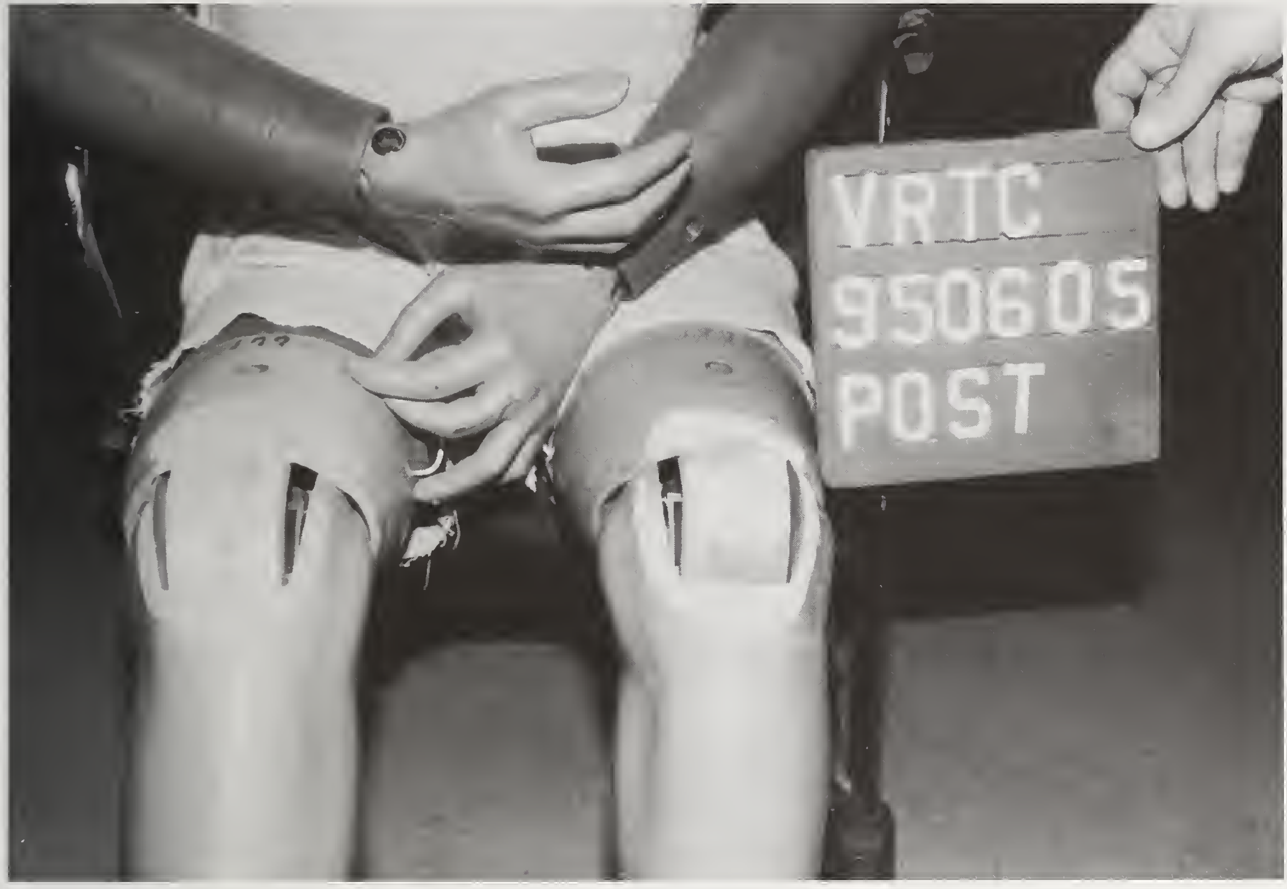


Figure A-45 Post-test Passenger Dummy Knee Contact - View 1

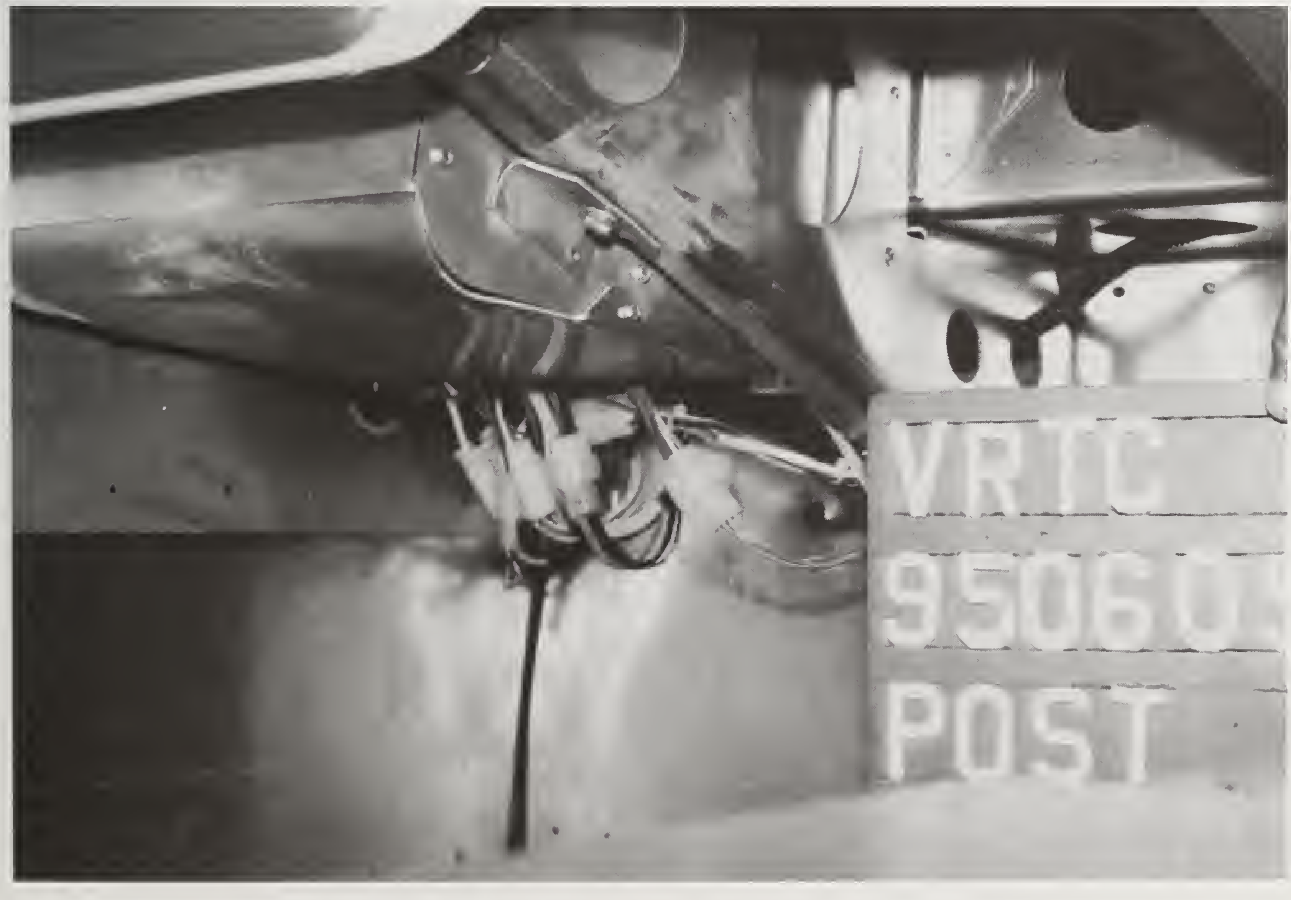


Figure A-46 Post-test Passenger Dummy Knee Contact - View 2

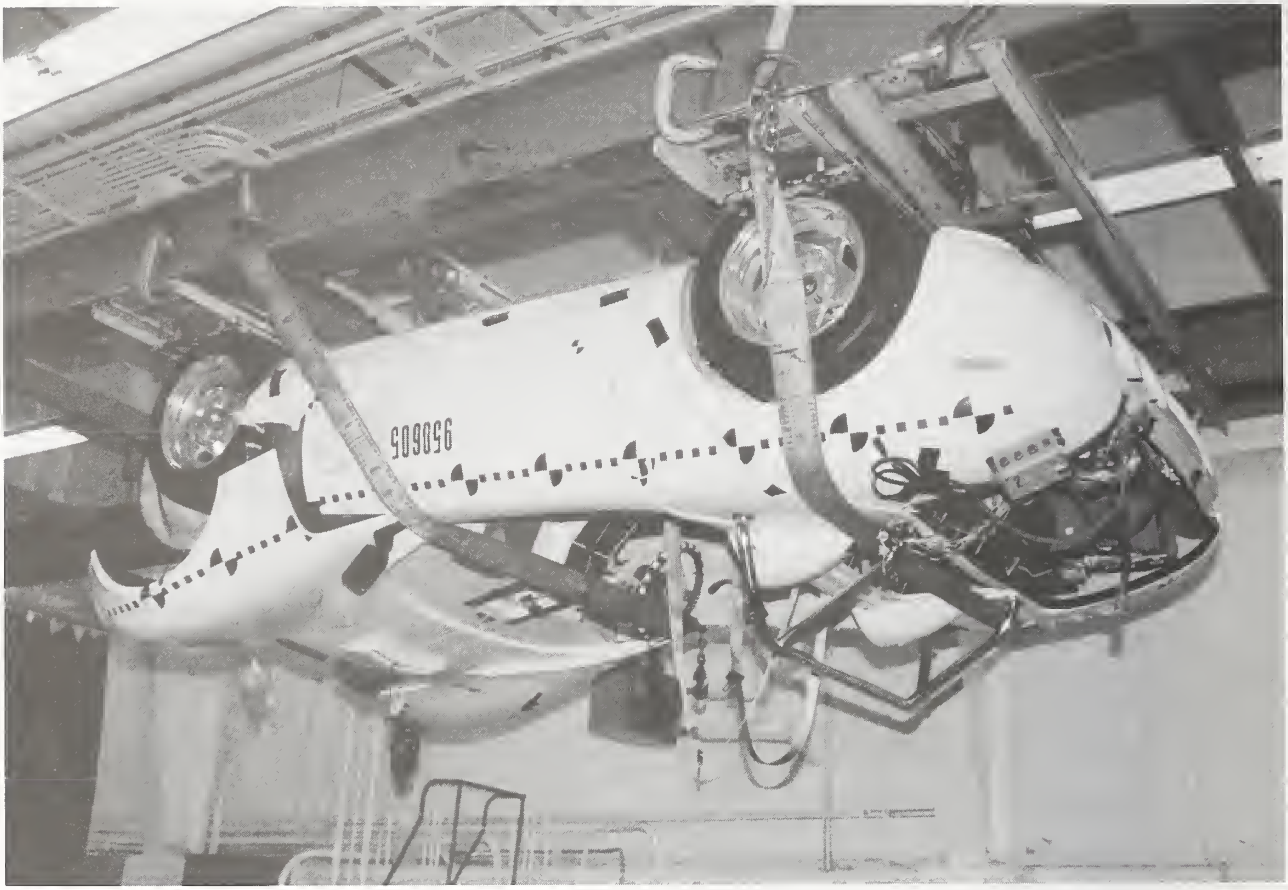


Figure A-47 Post-test Vehicle on Static Rollover Machine View

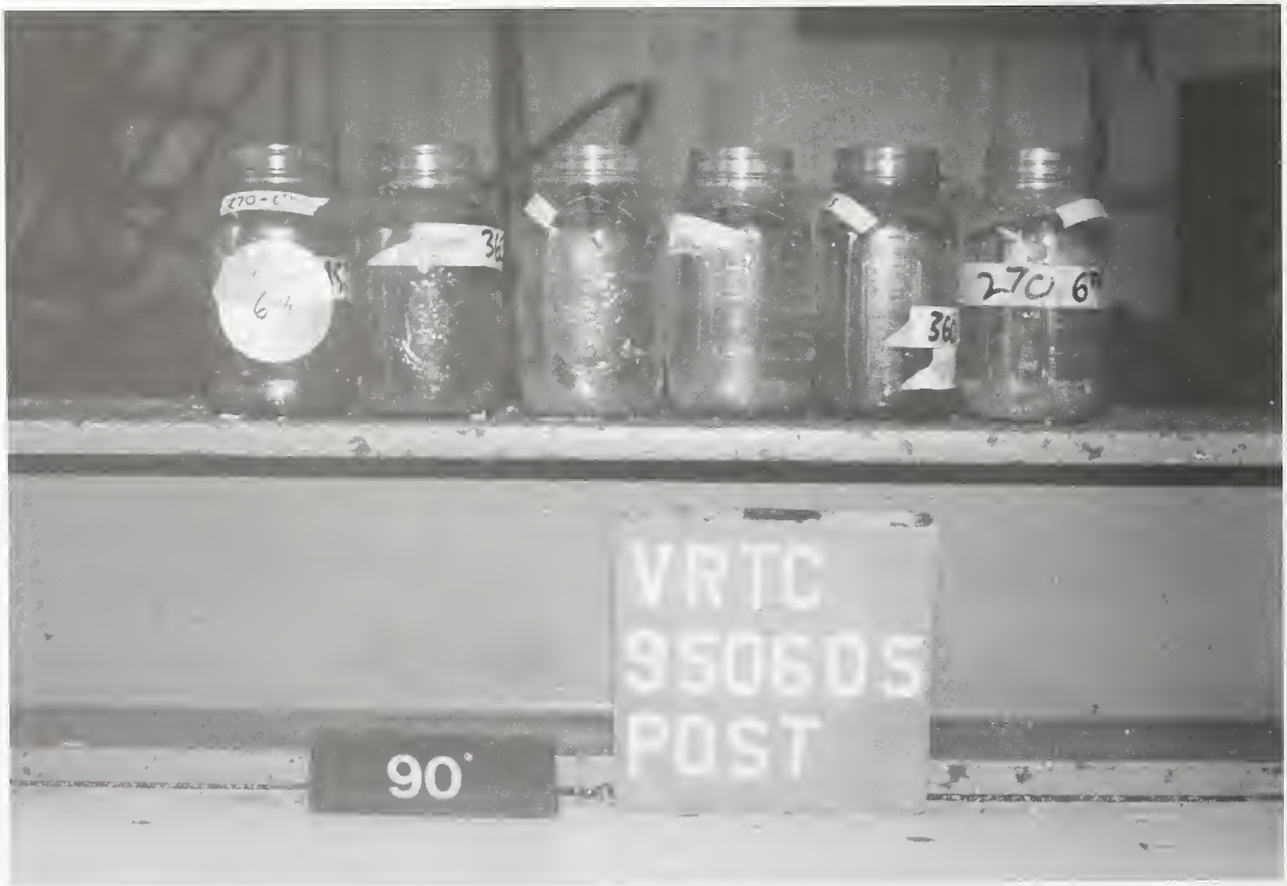


Figure A-48 Post-test Static Rollover Electrolyte Spillage 0° - 90°

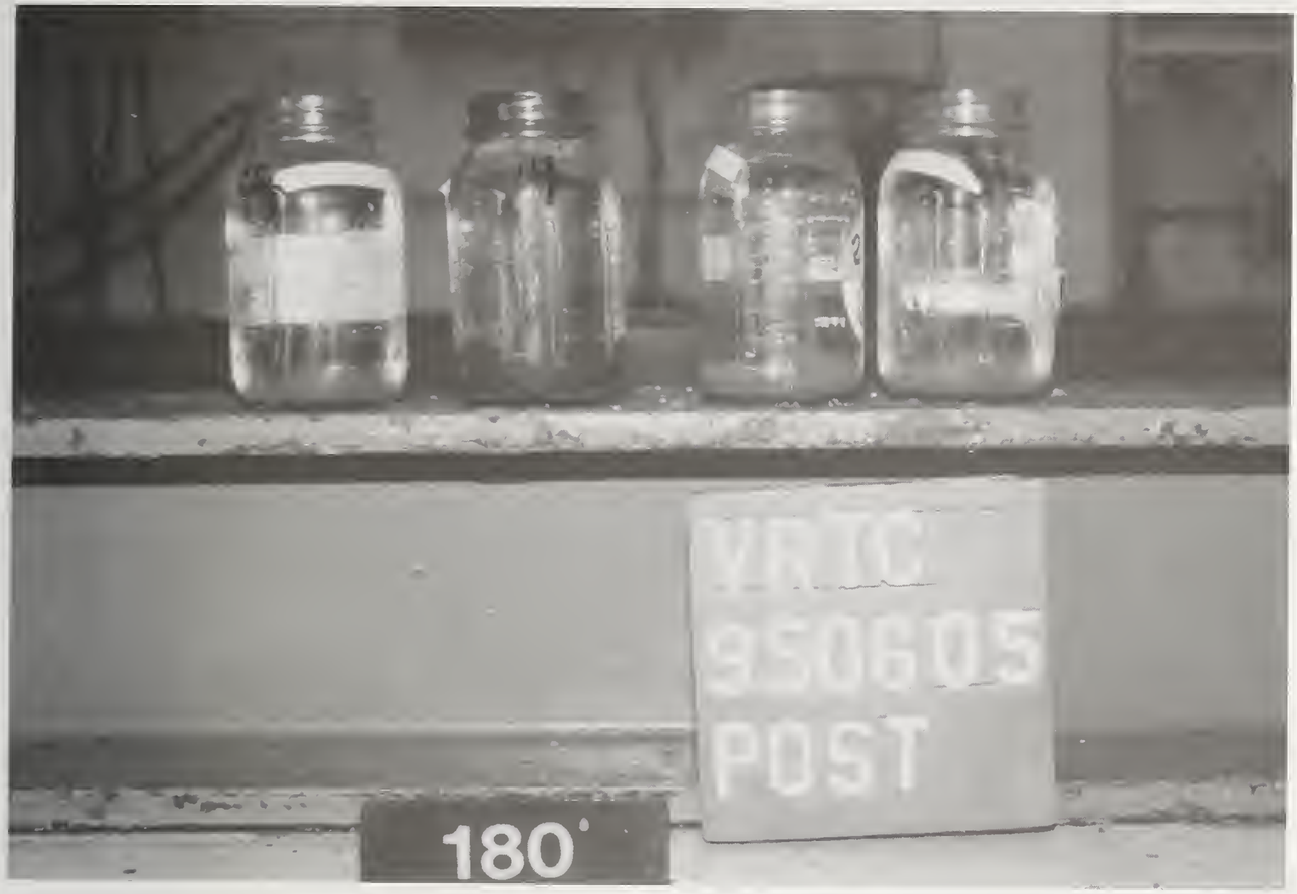


Figure A-49 Post-test Static Rollover Electrolyte Spillage 90° - 180°

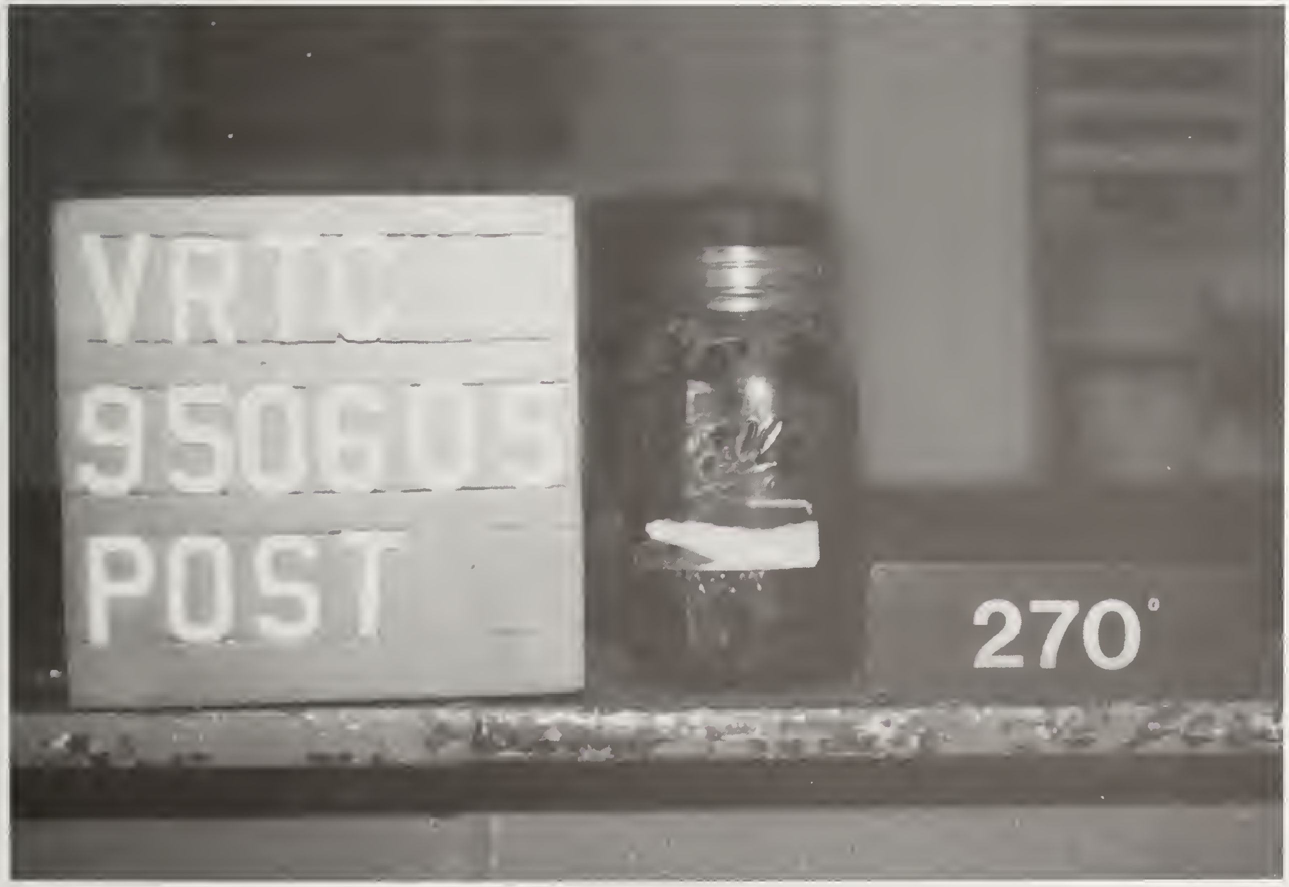


Figure A-50 Post-test Static Rollover Electrolyte Spillage 180° - 270°

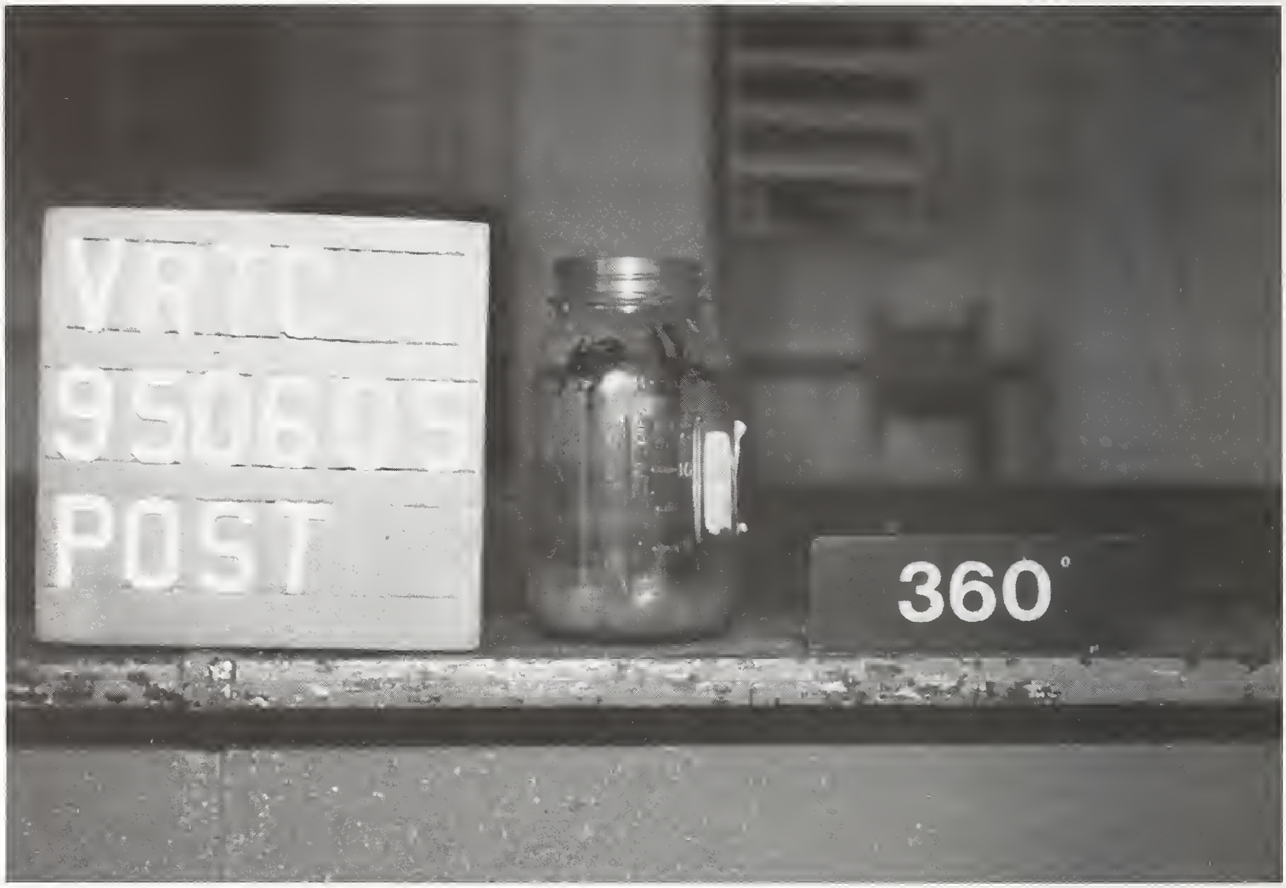
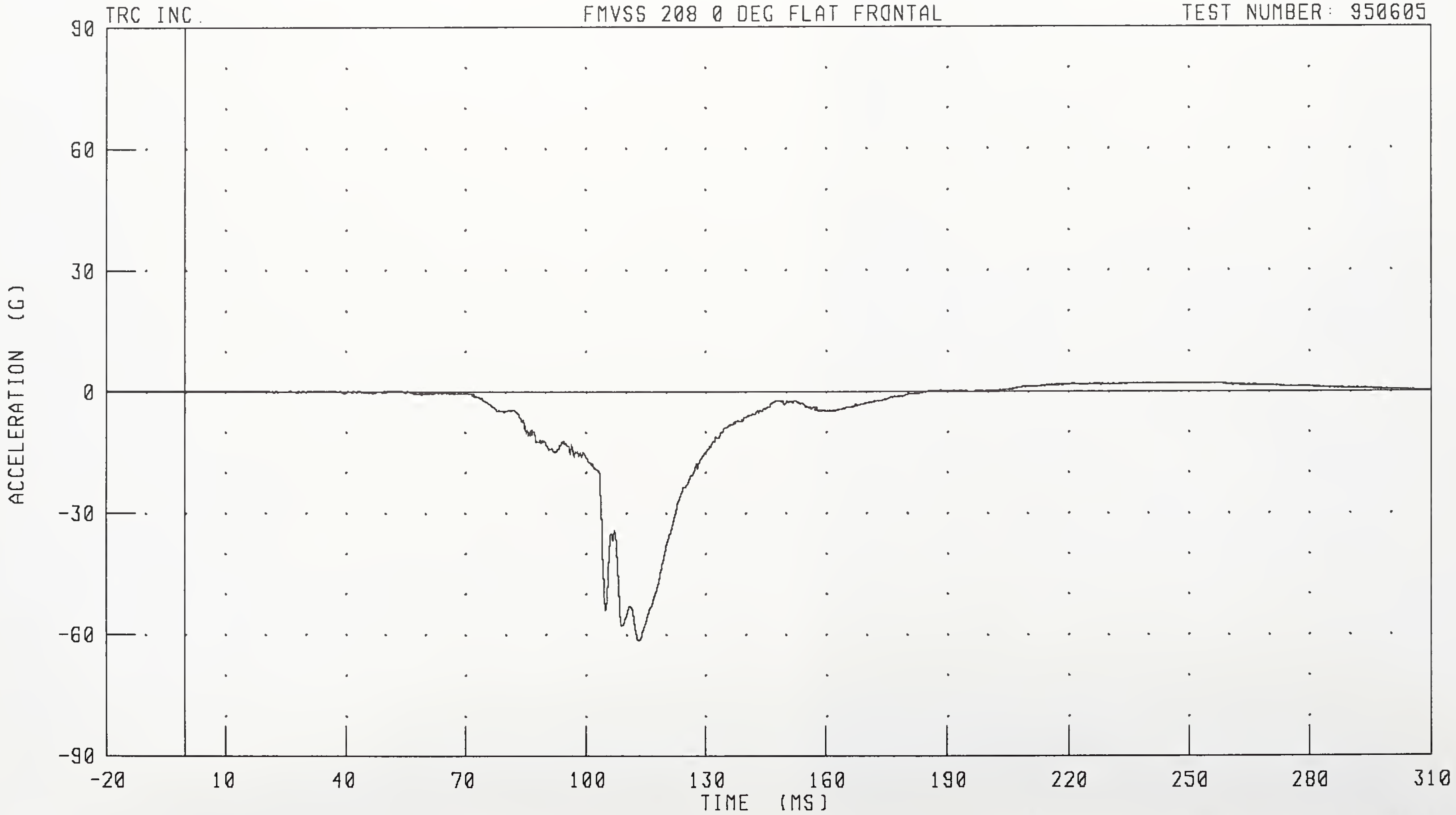


Figure A-51 Post-test Static Rollover Electrolyte Spillage 270° - 360°

Appendix B

Data Plots

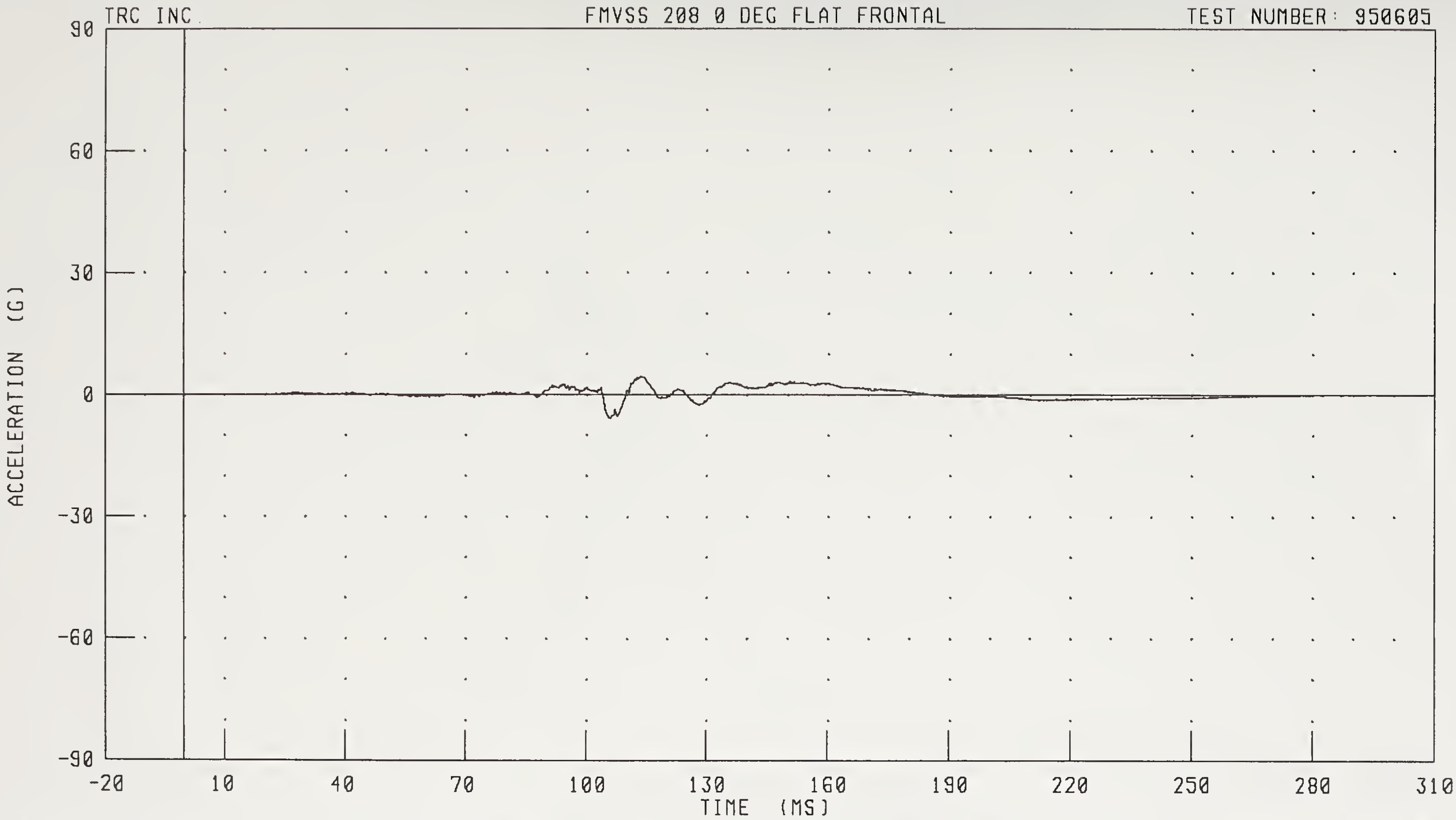
RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
DRIVER HEAD X-AXIS ACCELERATION
FMVSS 208 0 DEG FLAT FRONTAL



CHANNEL: HEDXG1 FILTER: CH. CLASS 1000 PEAK DATA: 2.14 G @ 228.48 MS; -61.57 G @ 113.04 MS

RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
DRIVER HEAD Y-AXIS ACCELERATION
FMVSS 208 0 DEG FLAT FRONTAL

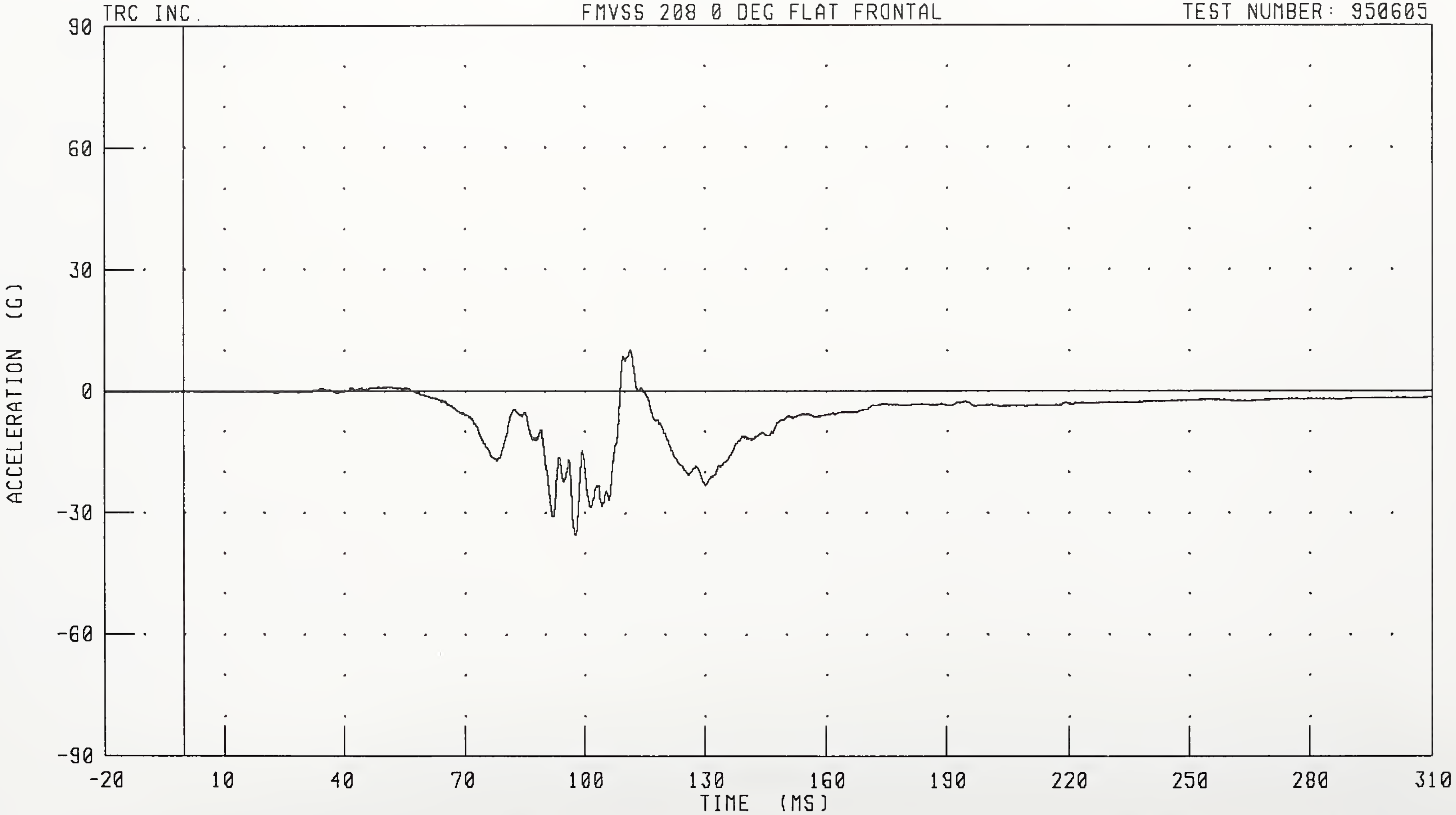
TEST NUMBER: 950605



CHANNEL: HEDYG1 FILTER: CH. CLASS 1000

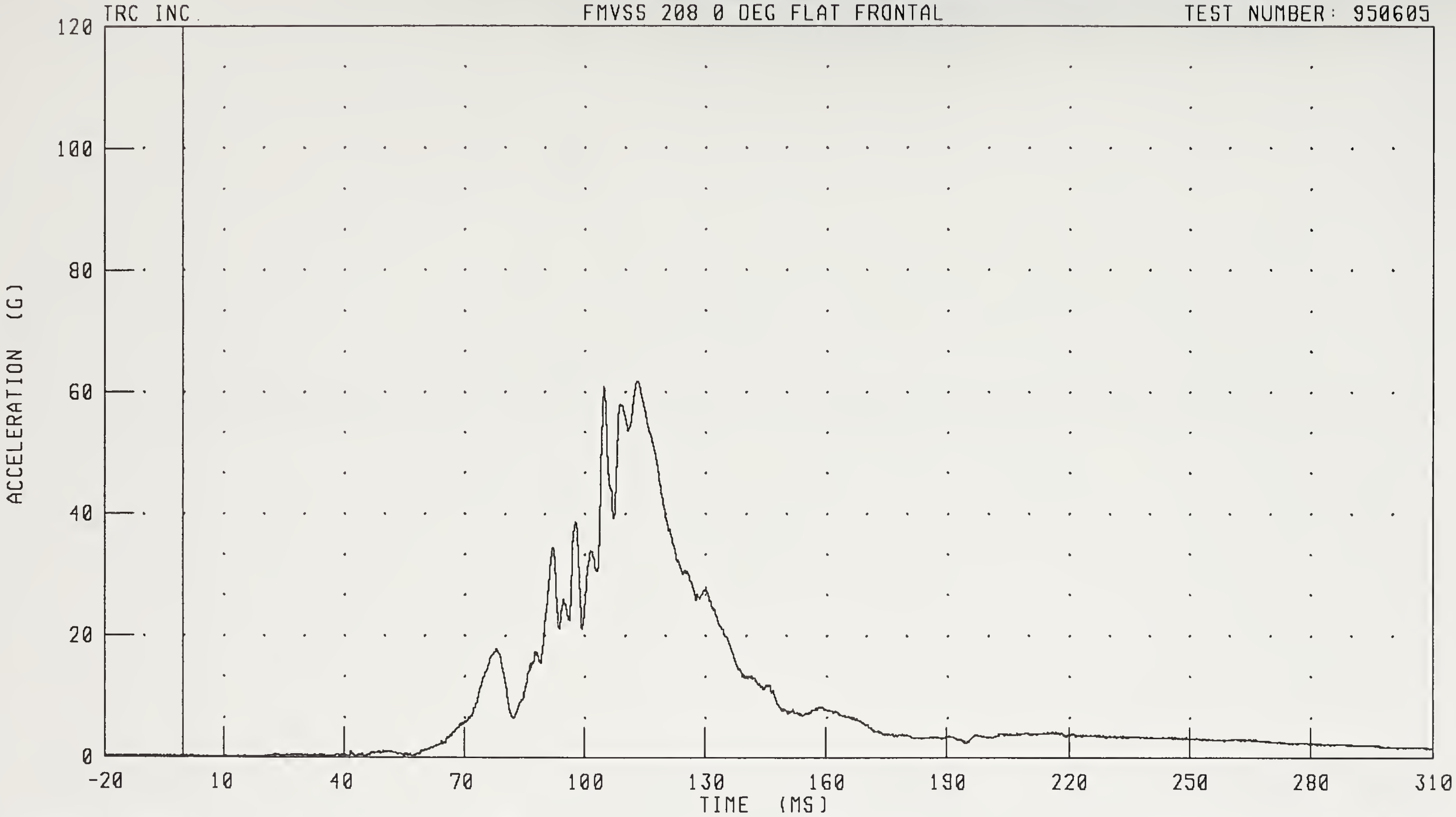
PEAK DATA: 4.64 G @ 113.36 MS; -5.92 G @ 105.60 MS

RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
DRIVER HEAD Z-AXIS ACCELERATION
FMVSS 208 0 DEG FLAT FRONTAL



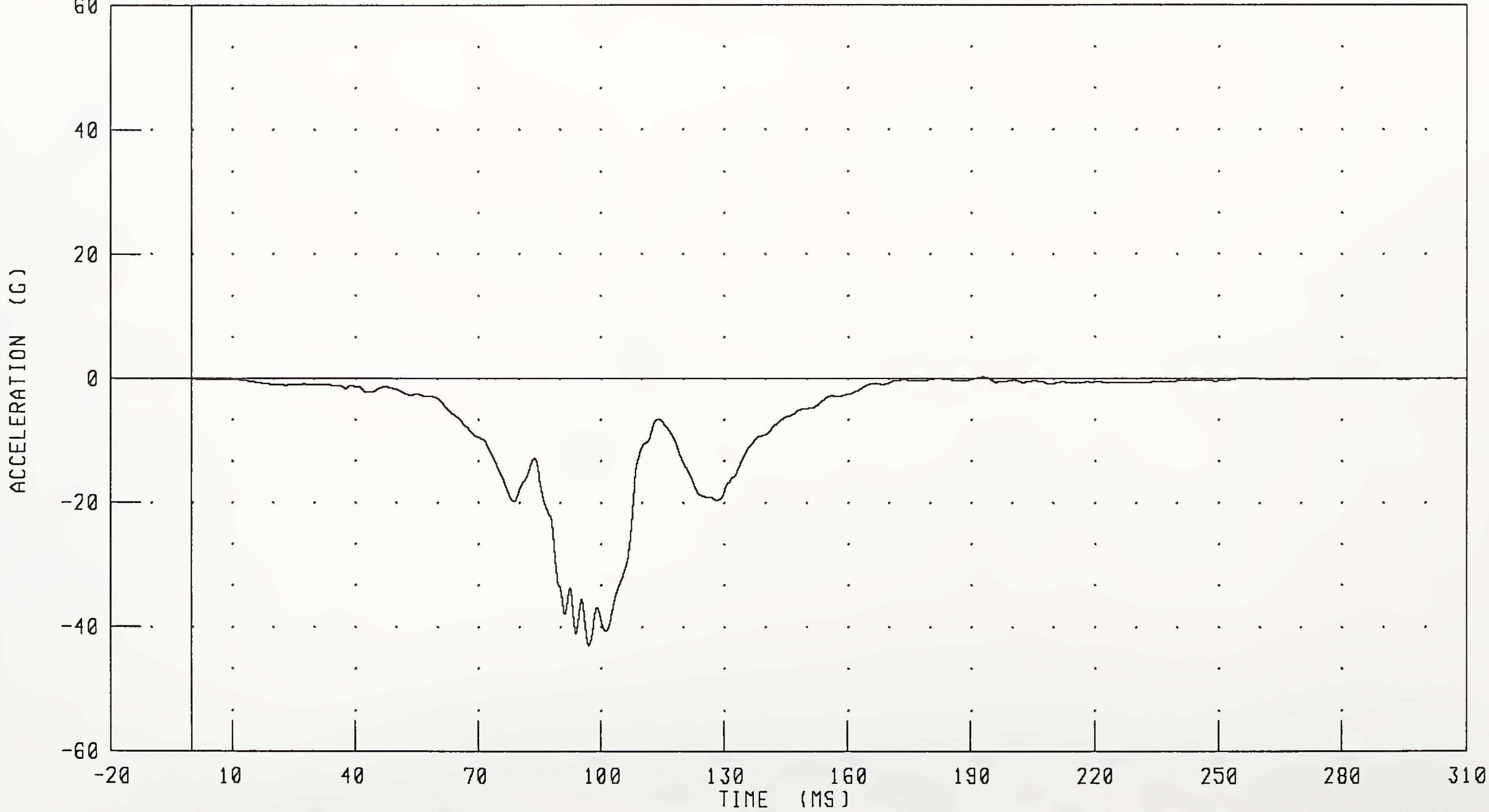
CHANNEL: HEDZG1 FILTER: CH. CLASS 1000 PEAK DATA: 10.27 G @ 111.44 MS; -35.59 G @ 97.60 MS

RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
DRIVER HEAD RESULTANT ACCELERATION
FMVSS 208 0 DEG FLAT FRONTAL



CHANNEL: HEDRG1 FILTER: CH. CLASS 1000 PEAK DATA: 61.73 G @ 113.28 MS; 0.16 G @ 19.12 MS

RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
DRIVER CHEST X-AXIS ACCELERATION
TRC INC. FMVSS 208 0 DEG FLAT FRONTAL TEST NUMBER: 950605

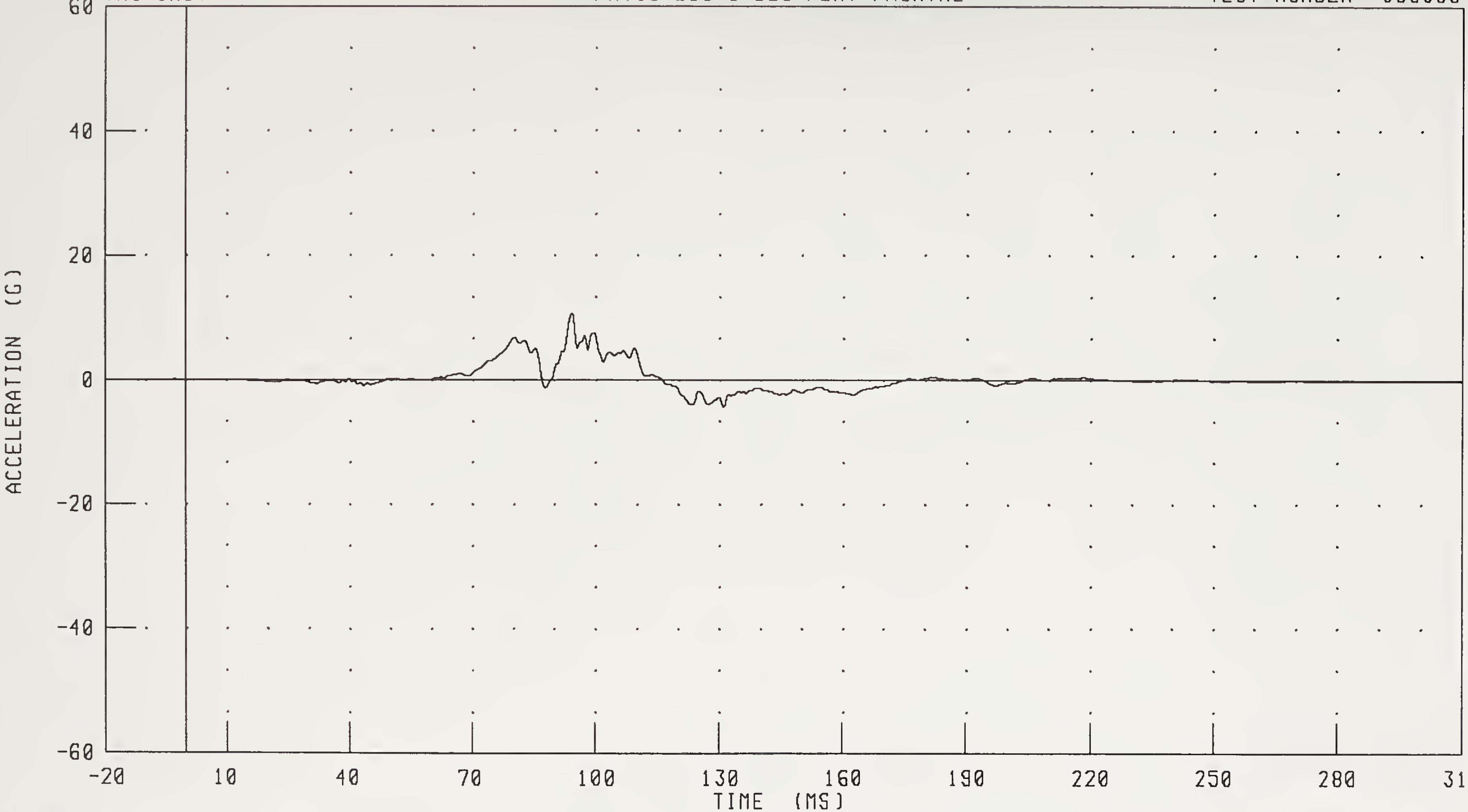


CHANNEL: CSTXG1 FILTER: CH. CLASS 180 PEAK DATA: 0.27 G @ 193.12 MS; -42.96 G @ 97.04 MS

RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
DRIVER CHEST Y-AXIS ACCELERATION
FMVSS 208 0 DEG FLAT FRONTAL

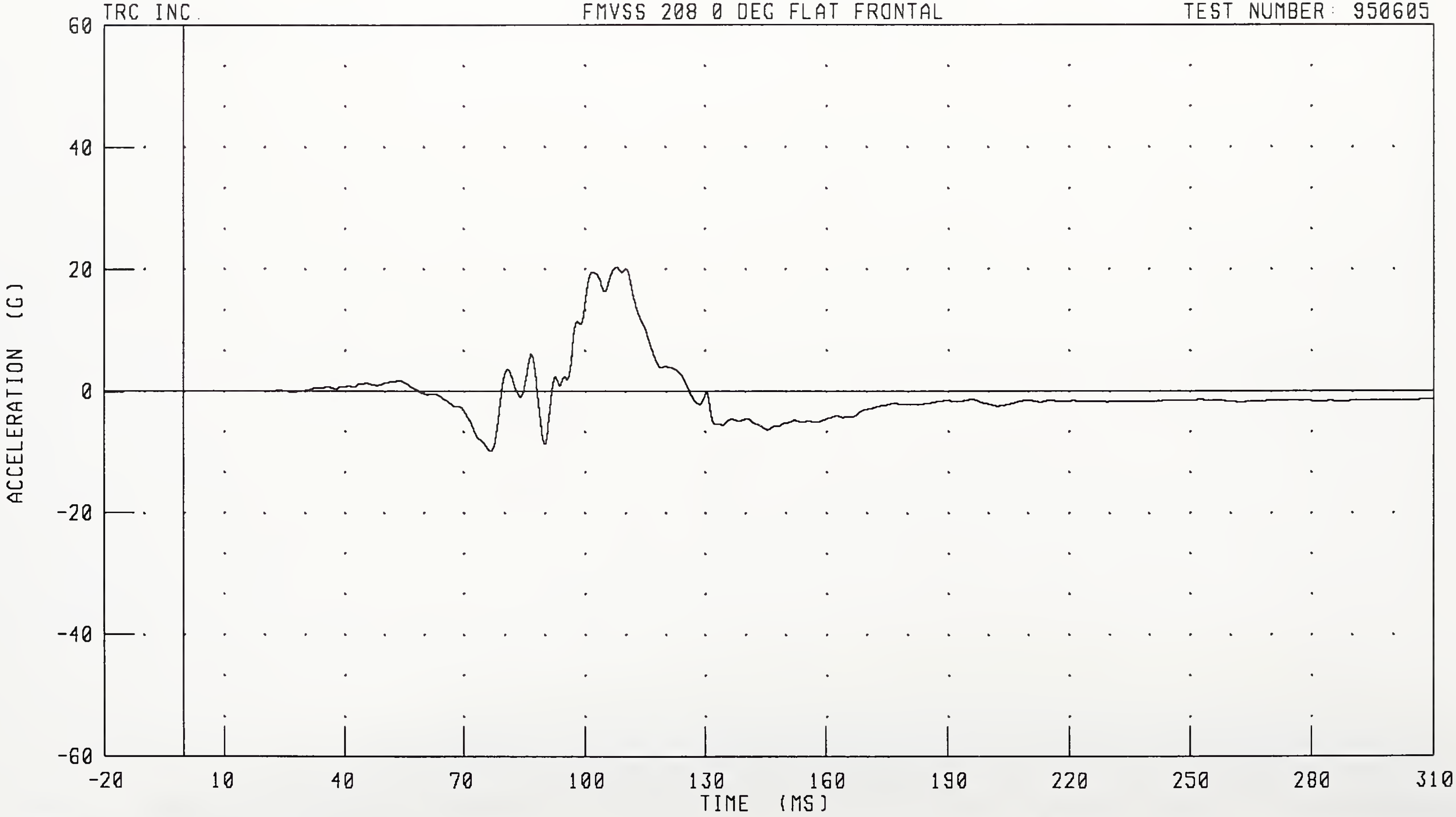
TRC INC.

TEST NUMBER: 950605



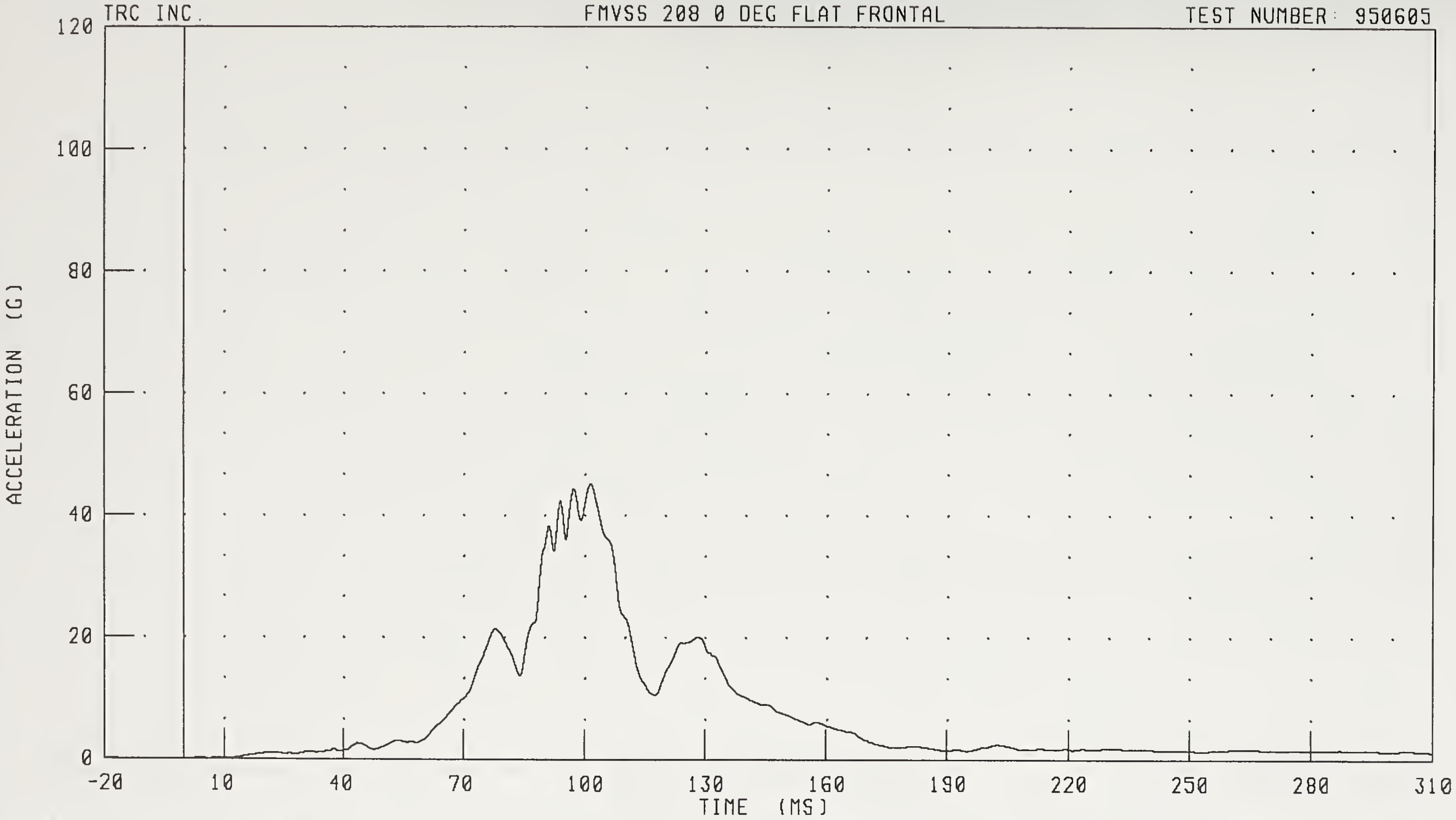
CHANNEL: CSTYG1   FILTER: CH. CLASS 180   PEAK DATA: 10.74 G @ 94.24 MS; -4.31 G @ 130.96 MS

RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
DRIVER CHEST Z-AXIS ACCELERATION



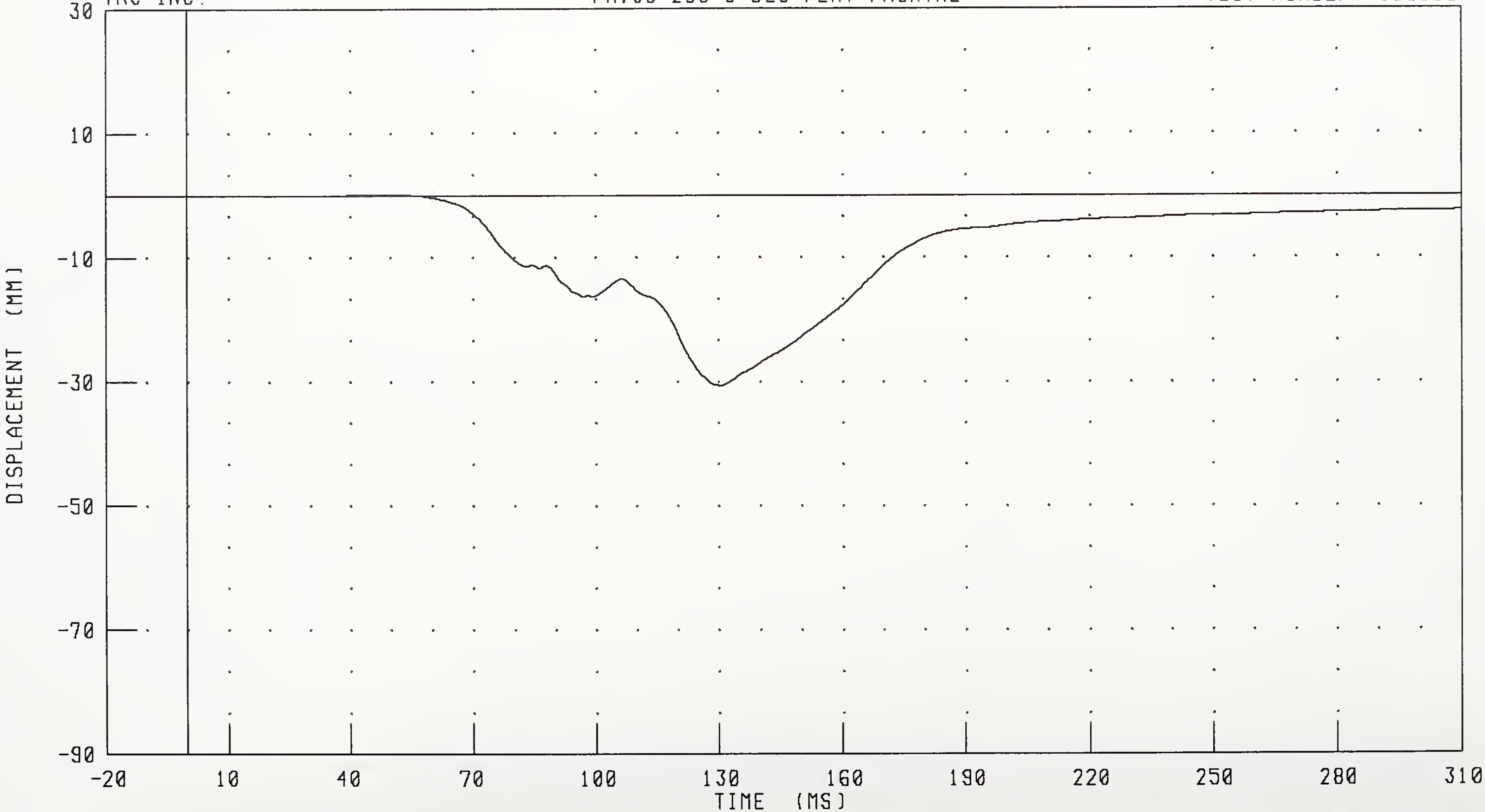
CHANNEL: CSTZG1   FILTER: CH. CLASS 180   PEAK DATA: 20.38 G @ 107.92 MS; -9.83 G @ 76.64 MS

RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
DRIVER CHEST RESULTANT ACCELERATION
FMVSS 208 0 DEG FLAT FRONTAL



CHANNEL: CSTRG1 FILTER: CH. CLASS 180 PEAK DATA: 45.08 G @ 101.44 MS; 0.02 G @ -20.00 MS

RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
DRIVER CHEST DEFLECTION
TRC INC. FMVSS 208 0 DEG FLAT FRONTAL TEST NUMBER: 950605

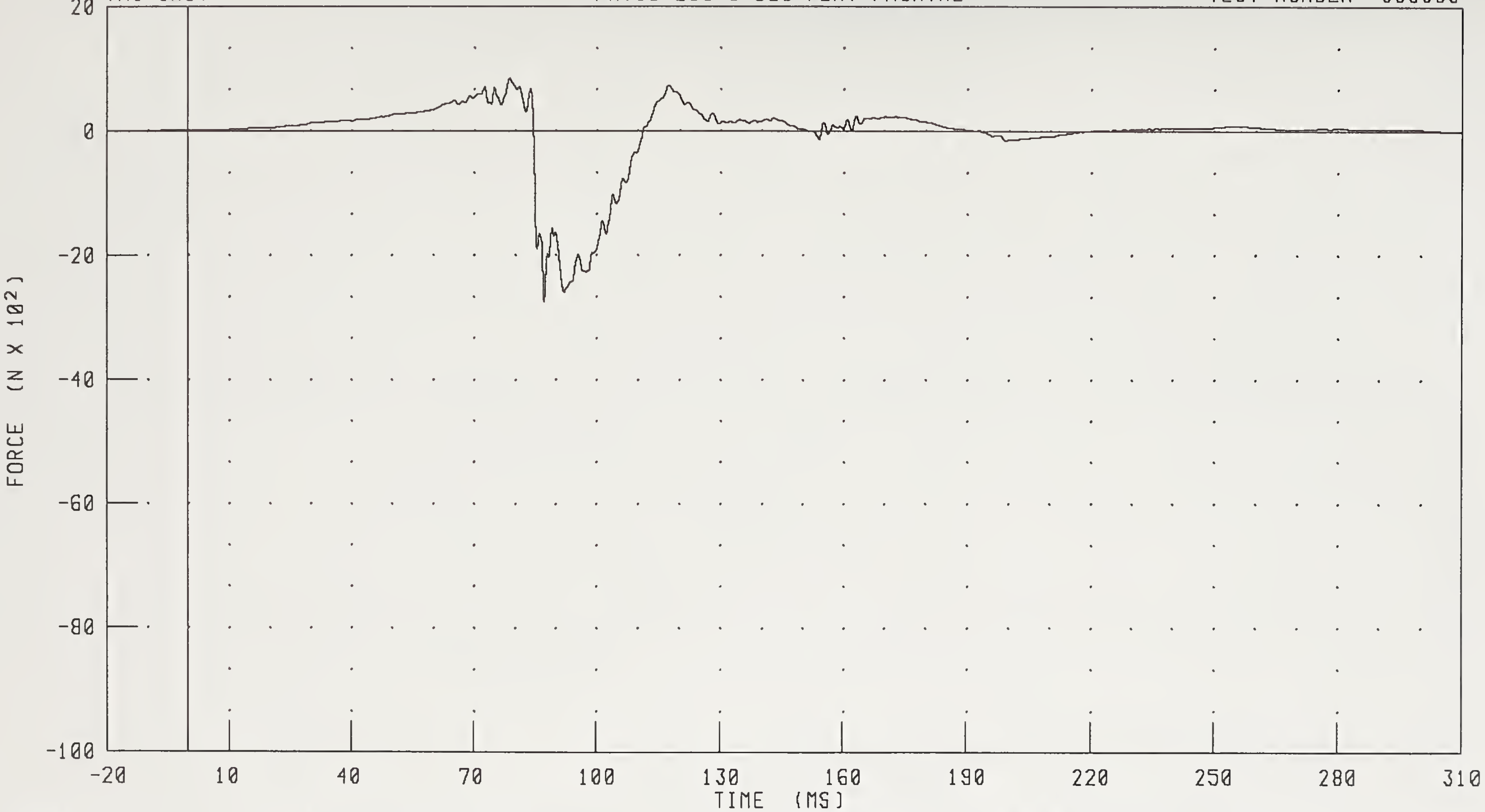


CHANNEL: CSTXD1 FILTER: CH. CLASS 180 PEAK DATA: 0.09 MM @ 51.44 MS; -30.63 MM @ 130.64 MS

RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
DRIVER LEFT FEMUR FORCE
FMVSS 208 0 DEG FLAT FRONTAL

TRC INC.

TEST NUMBER: 950605

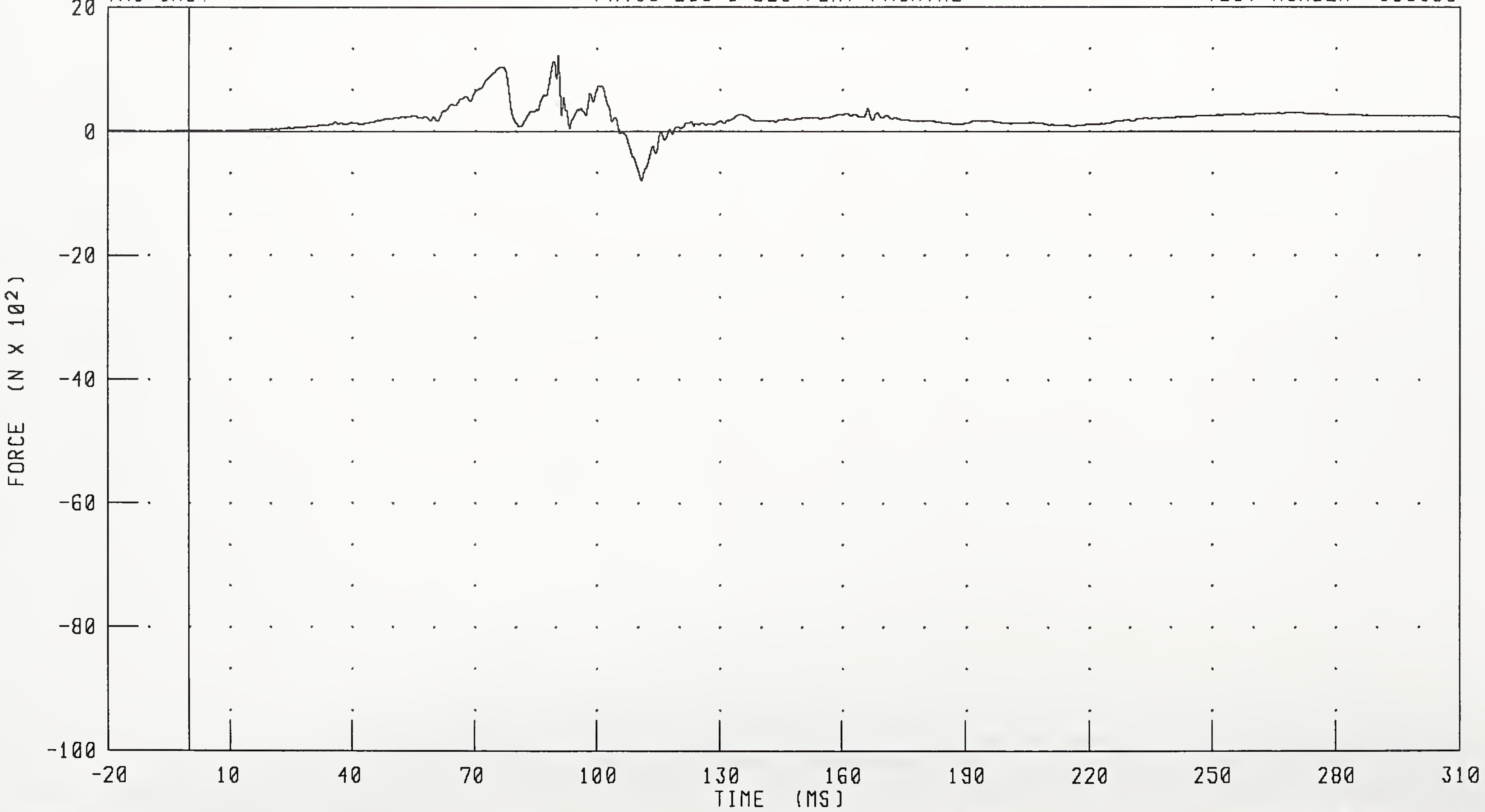


CHANNEL: LFMF1 FILTER: CH. CLASS 600

PEAK DATA: 846.99 N @ 78.64 MS; -2749.66 N @ 87.20 MS

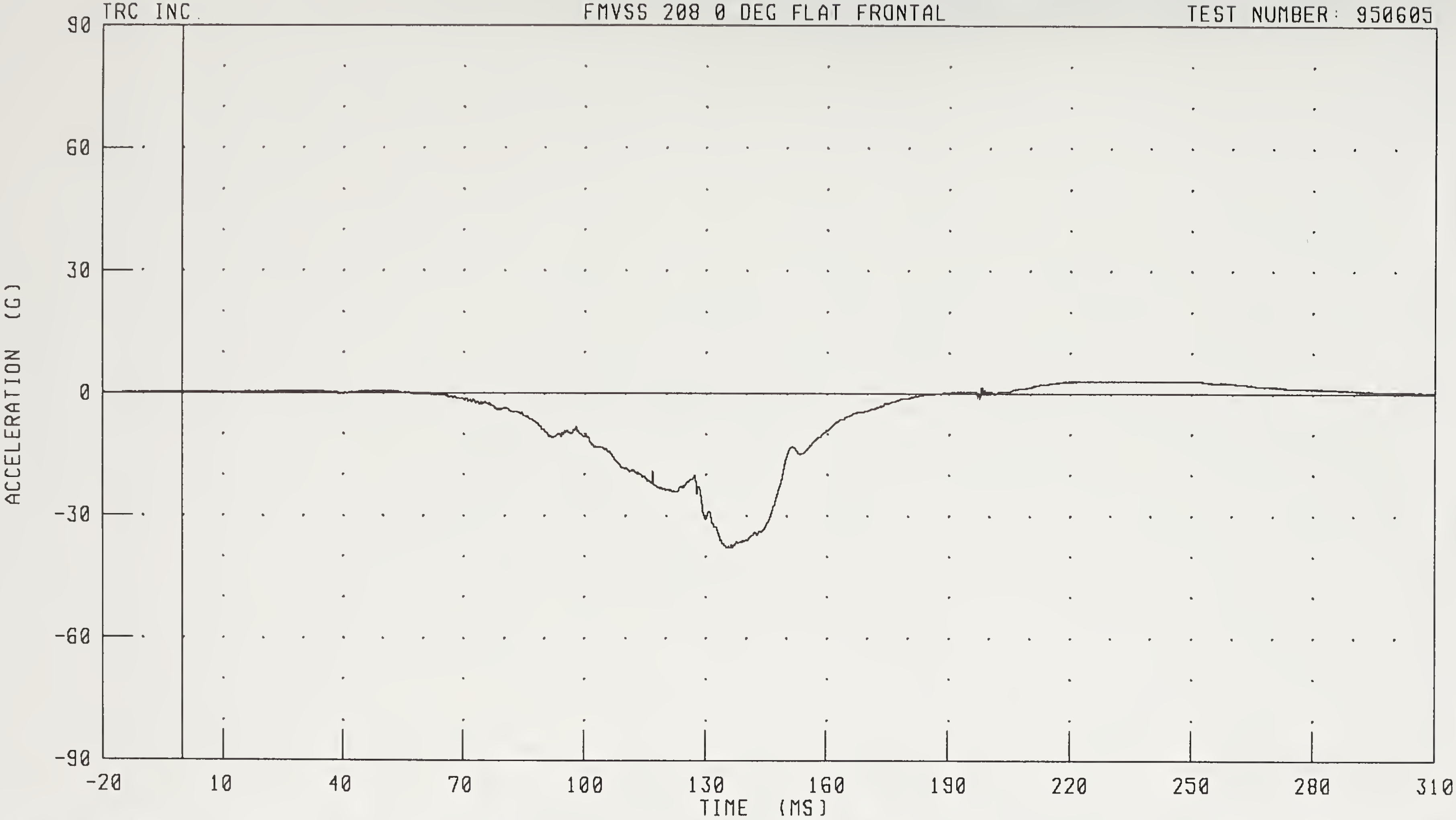
RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
DRIVER RIGHT FEMUR FORCE

TRC INC.　　FMVSS 208 0 DEG FLAT FRONTAL　　TEST NUMBER: 950605



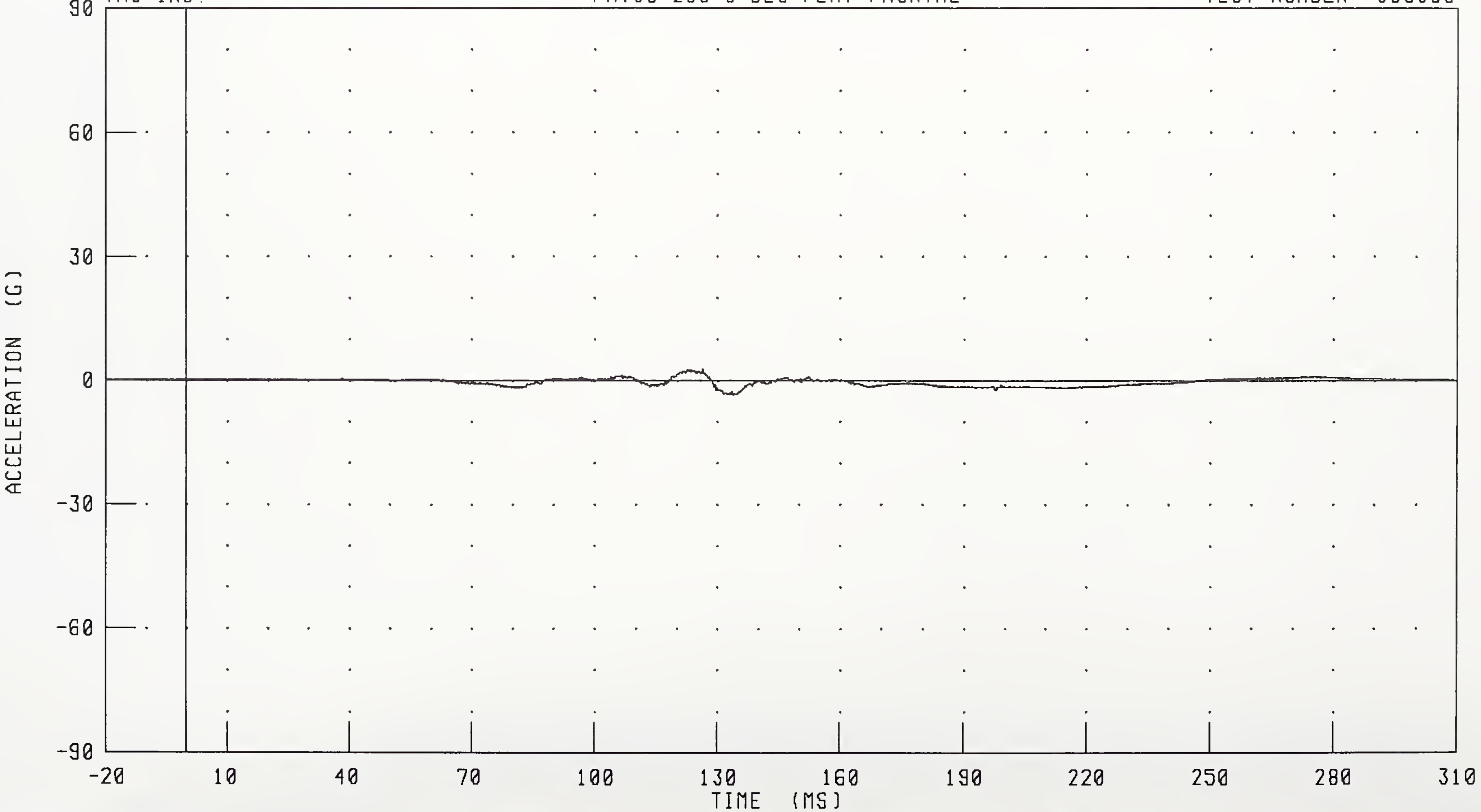
CHANNEL: RFMF1　　FILTER: CH. CLASS 600　　PEAK DATA: 1220.99 N @ 90.72 MS; -793.25 N @ 110.96 MS

RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD X-AXIS ACCELERATION
FMVSS 208 0 DEG FLAT FRONTAL



CHANNEL: HEDXG2   FILTER: CH. CLASS 1000   PEAK DATA: 3.16 G @ 222.88 MS; -37.91 G @ 135.20 MS

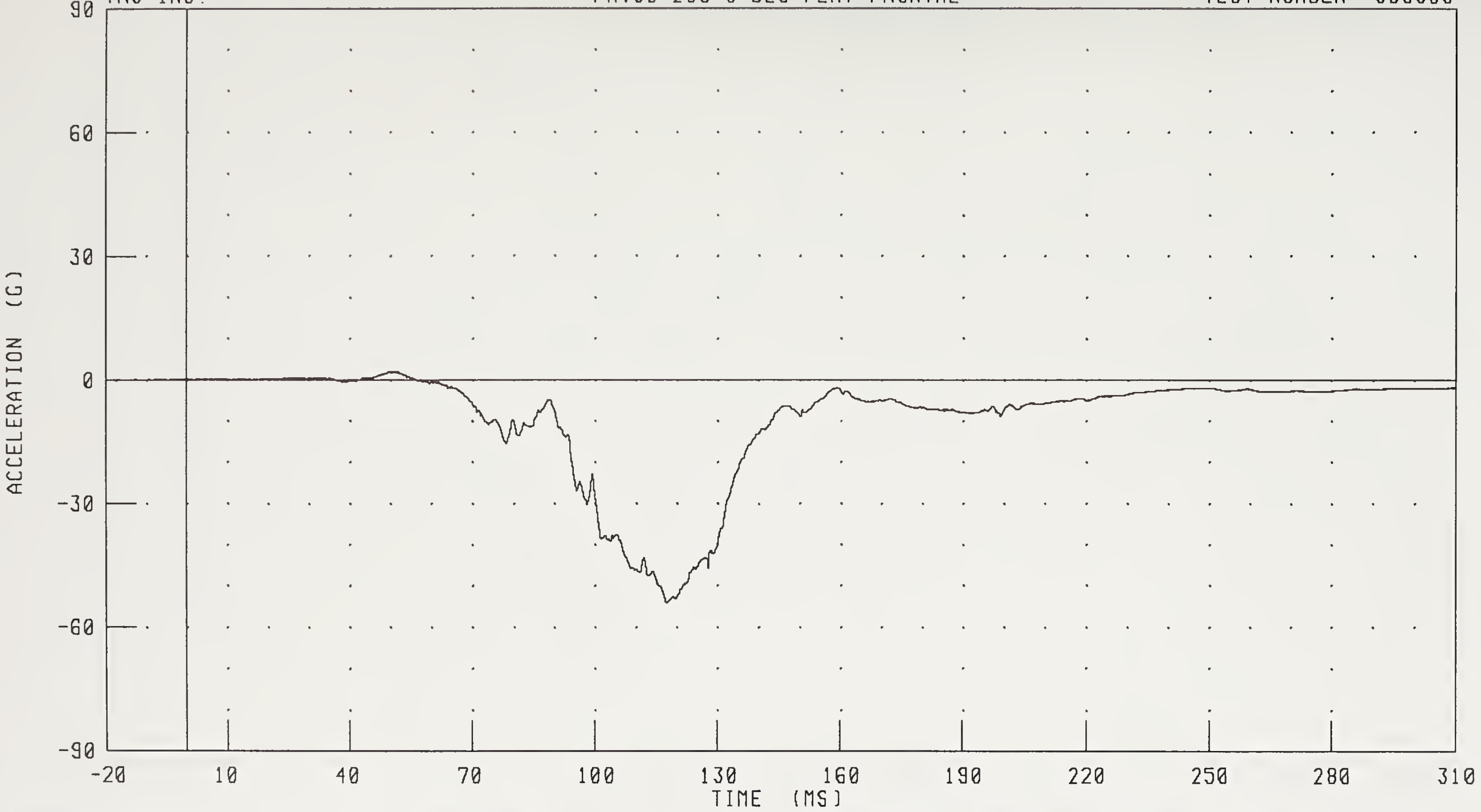
RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION
TRC INC. FMVSS 208 0 DEG FLAT FRONTAL TEST NUMBER: 950605



CHANNEL: HEDYG2 FILTER: CH. CLASS 1000 PEAK DATA: 2.90 G @ 126.48 MS; -3.58 G @ 133.92 MS

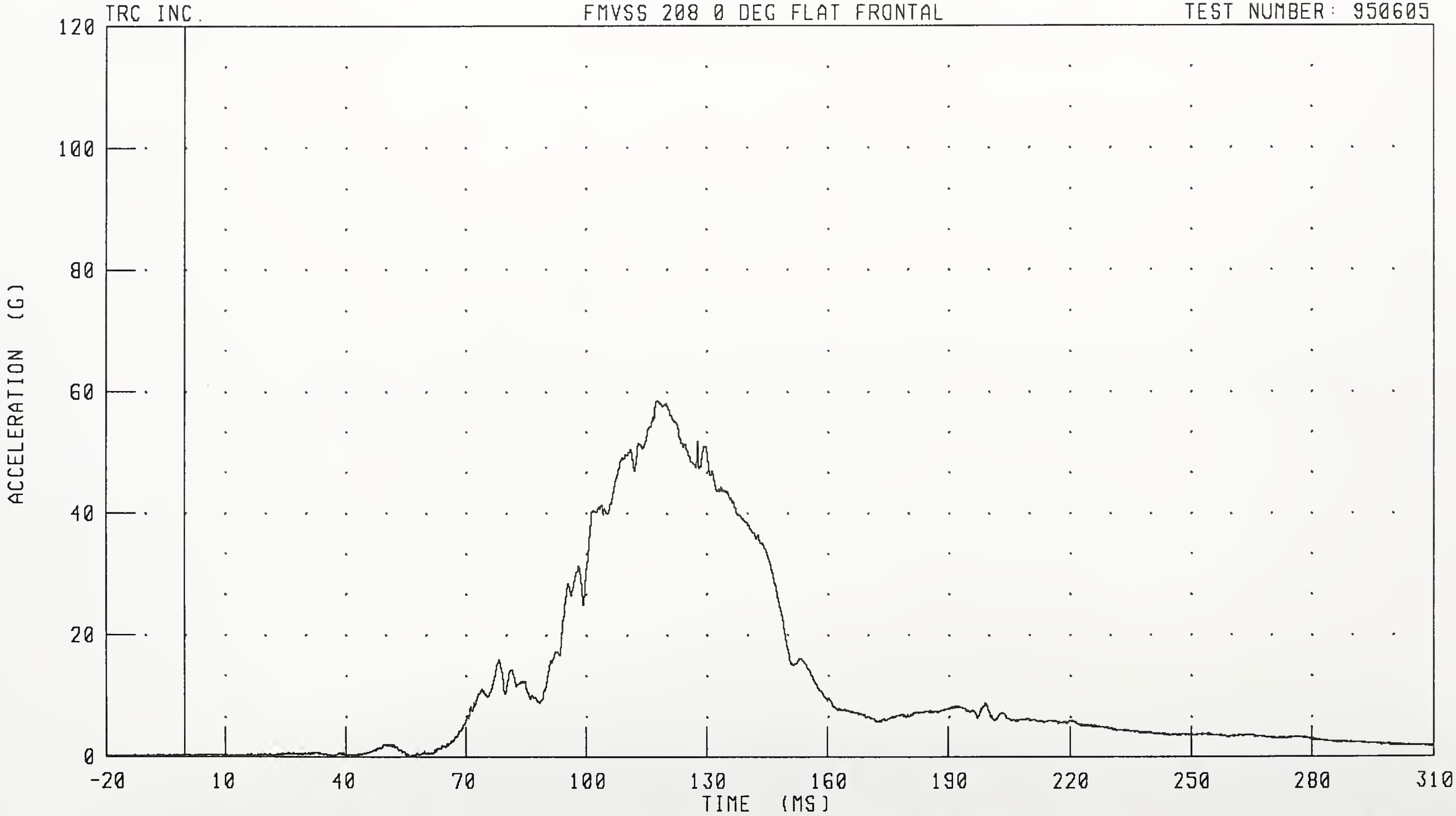
RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD Z-AXIS ACCELERATION

TRC INC. FMVSS 208 0 DEG FLAT FRONTAL TEST NUMBER: 950605



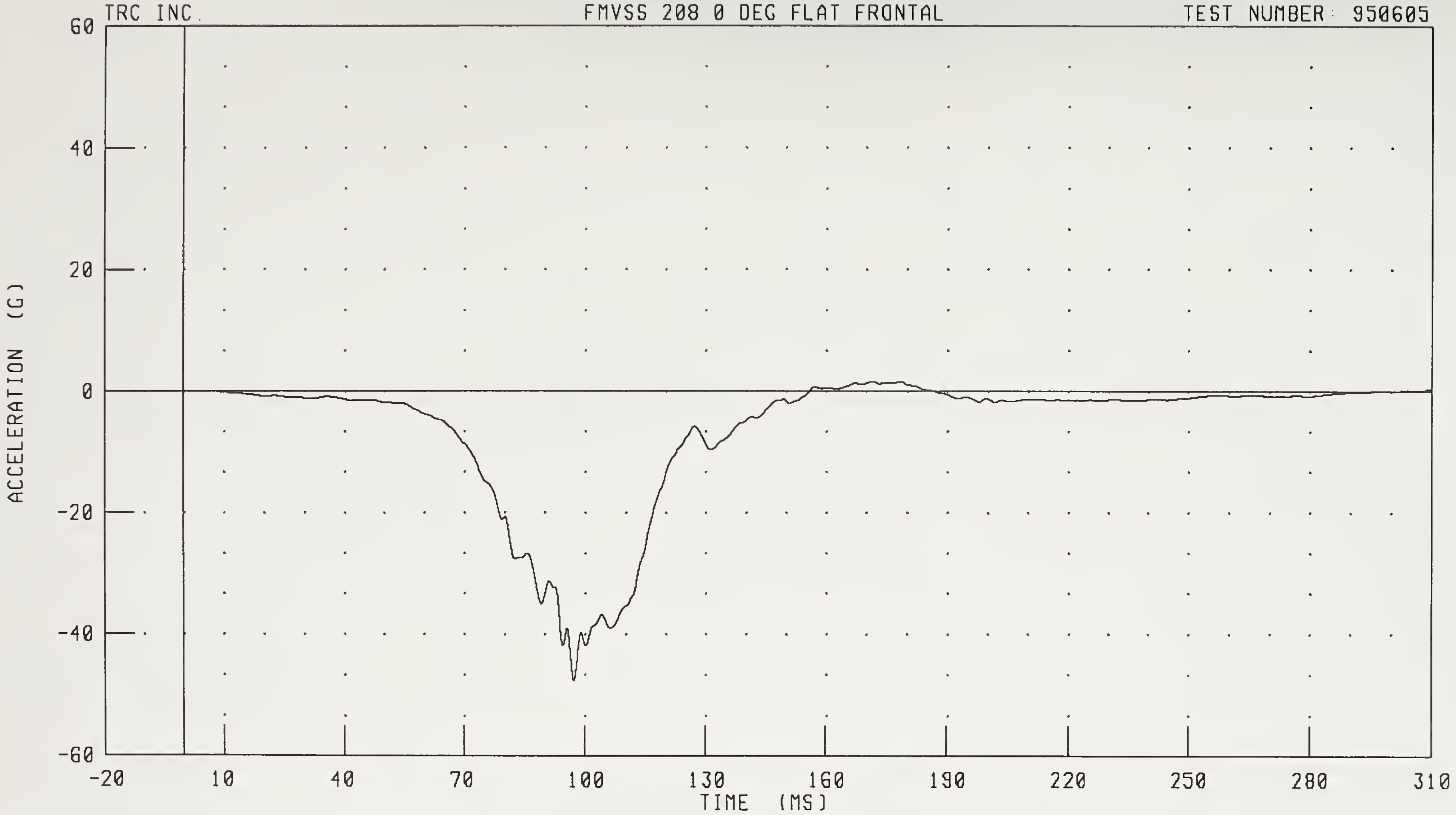
CHANNEL: HEDZG2 FILTER: CH. CLASS 1000 PEAK DATA: 2.01 G @ 49.36 MS; -54.01 G @ 117.52 MS

RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD RESULTANT ACCELERATION
FMVSS 208 0 DEG FLAT FRONTAL



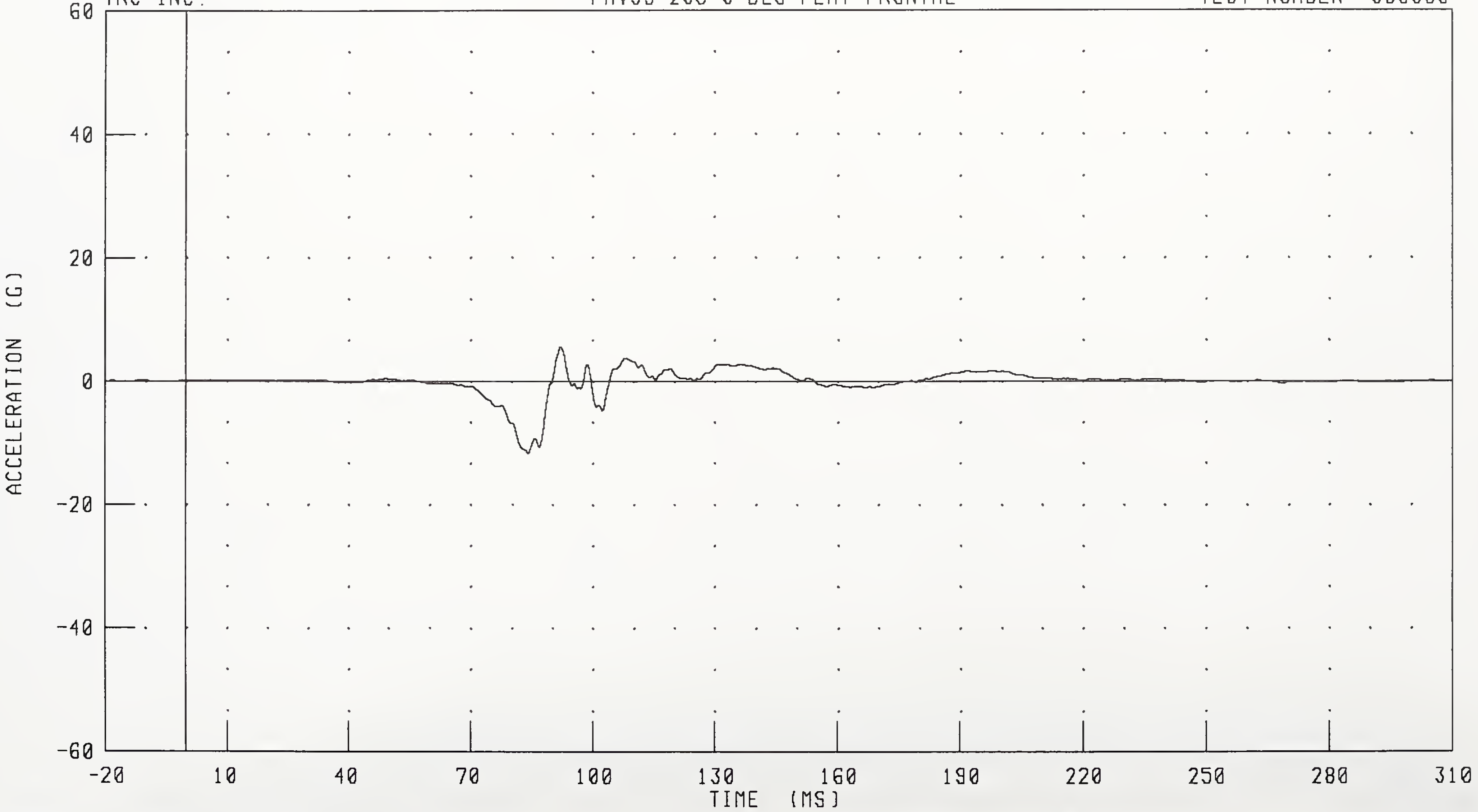
CHANNEL: HEDRG2 FILTER: CH. CLASS 1000 PEAK DATA: 58.57 G @ 117.68 MS; 0.07 G @ -20.00 MS

RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION



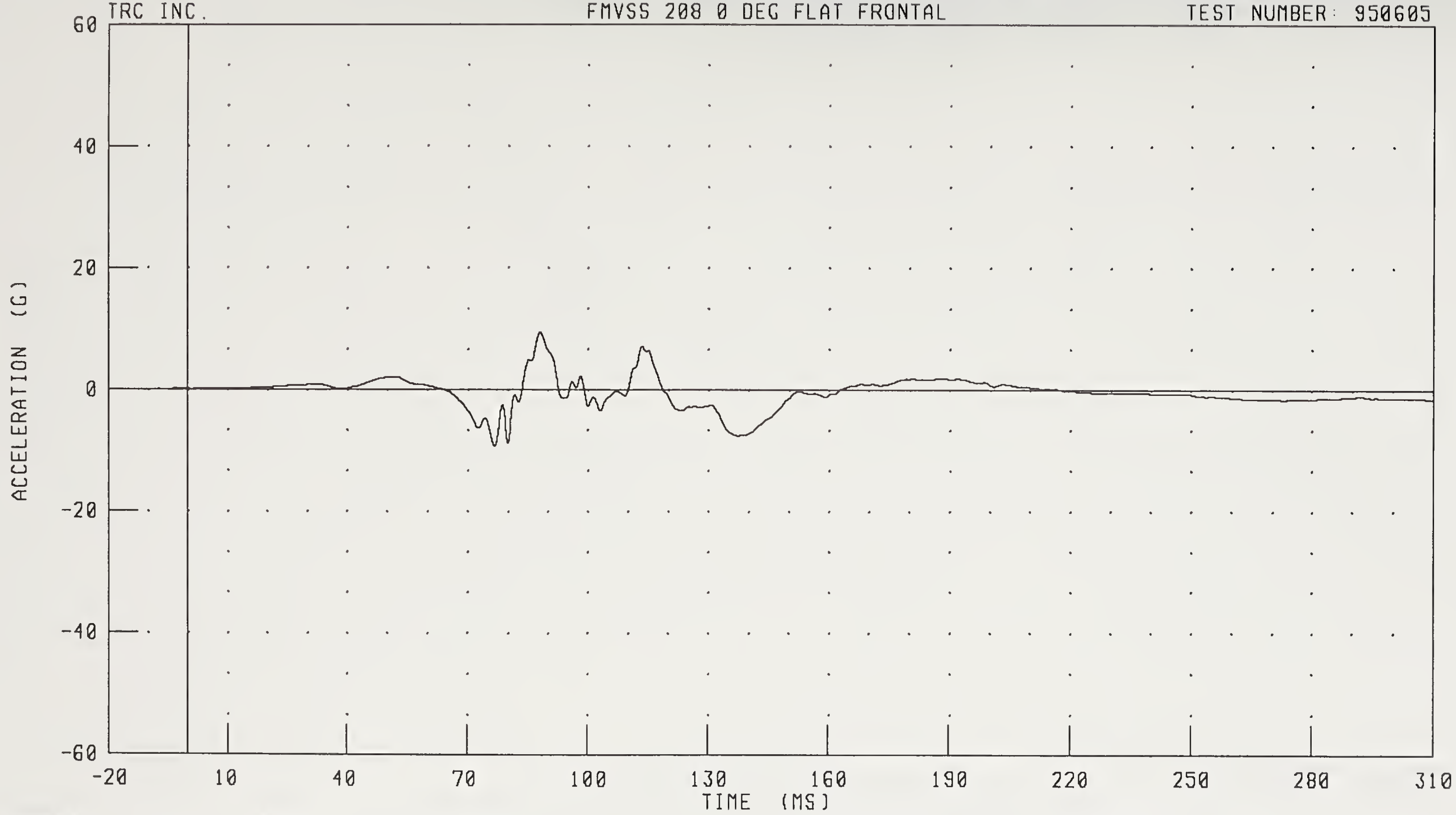
CHANNEL: CSTXG2 FILTER: CH. CLASS 180 PEAK DATA: 1.59 G @ 171.52 MS; -47.55 G @ 97.20 MS

RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST Y-AXIS ACCELERATION
TRC INC. FMVSS 208 0 DEG FLAT FRONTAL TEST NUMBER: 950605



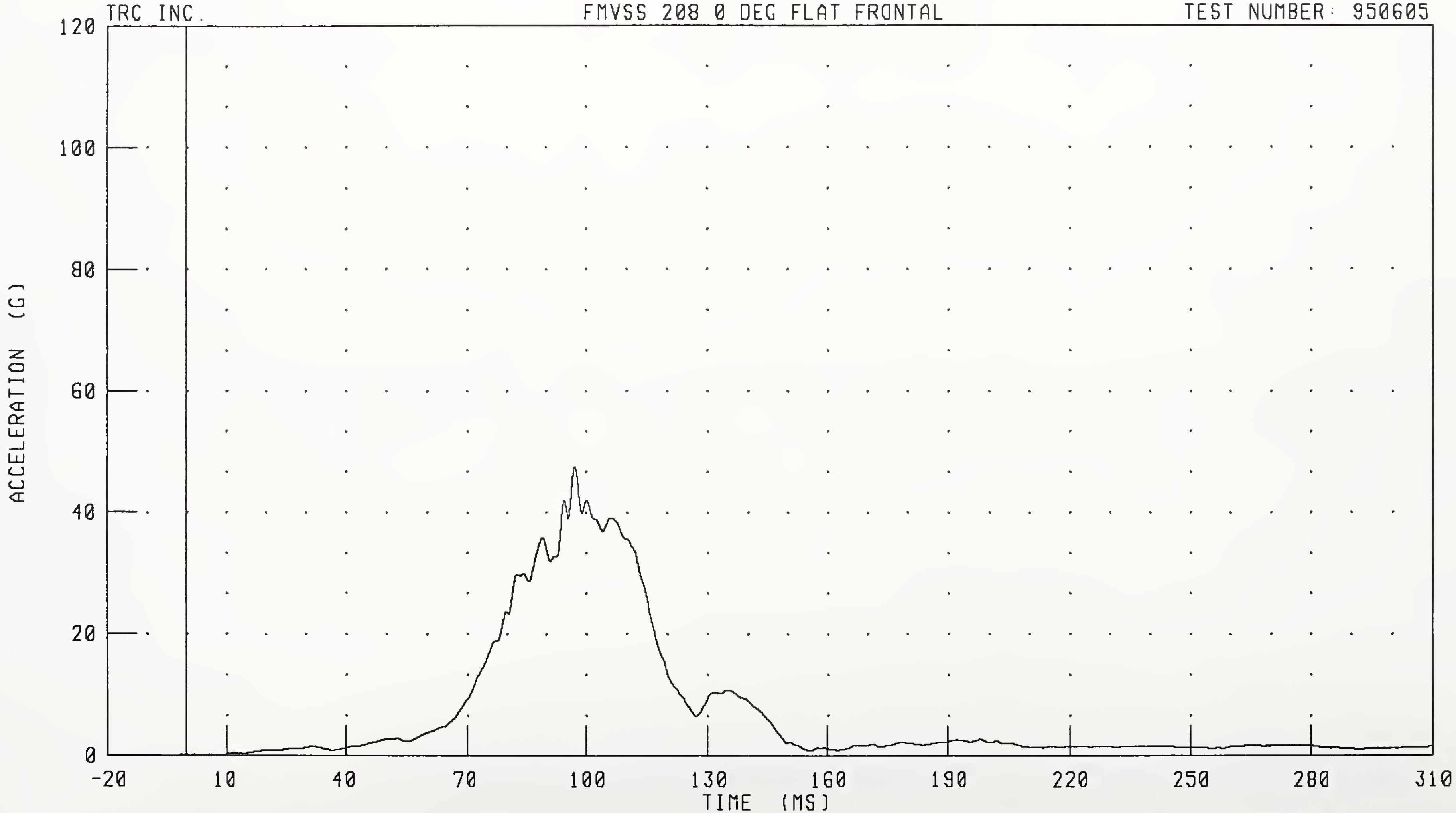
CHANNEL: CSTYG2 FILTER: CH. CLASS 180 PEAK DATA: 5.67 G @ 92.08 MS; -11.66 G @ 84.08 MS

RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST Z-AXIS ACCELERATION



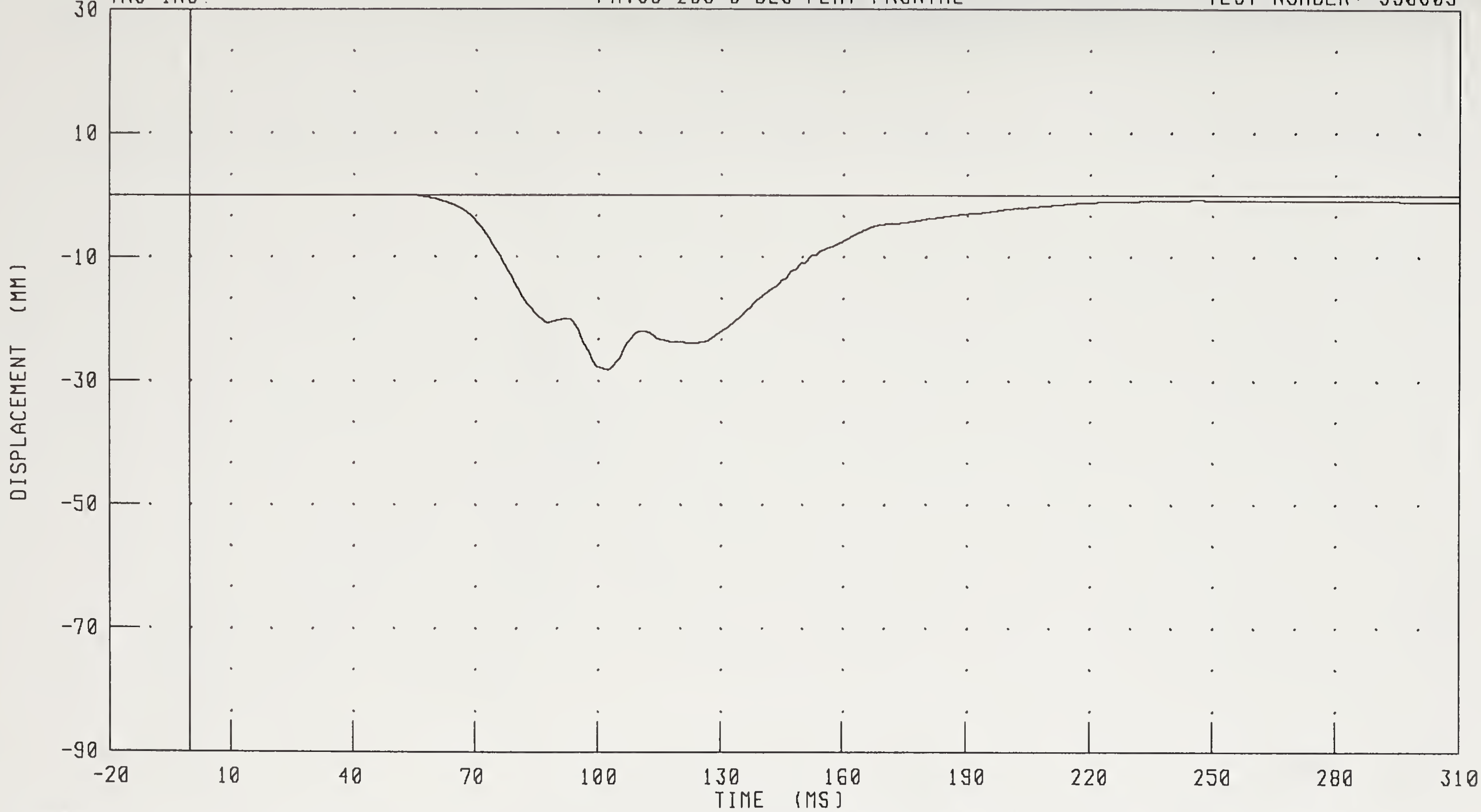
CHANNEL: CSTZG2   FILTER: CH. CLASS 180   PEAK DATA: 9.49 G @ 88.00 MS; -9.29 G @ 76.72 MS

RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION



CHANNEL: CSTRG2   FILTER: CH. CLASS 180   PEAK DATA: 47.57 G @ 97.20 MS; 0.01 G @ -20.00 MS

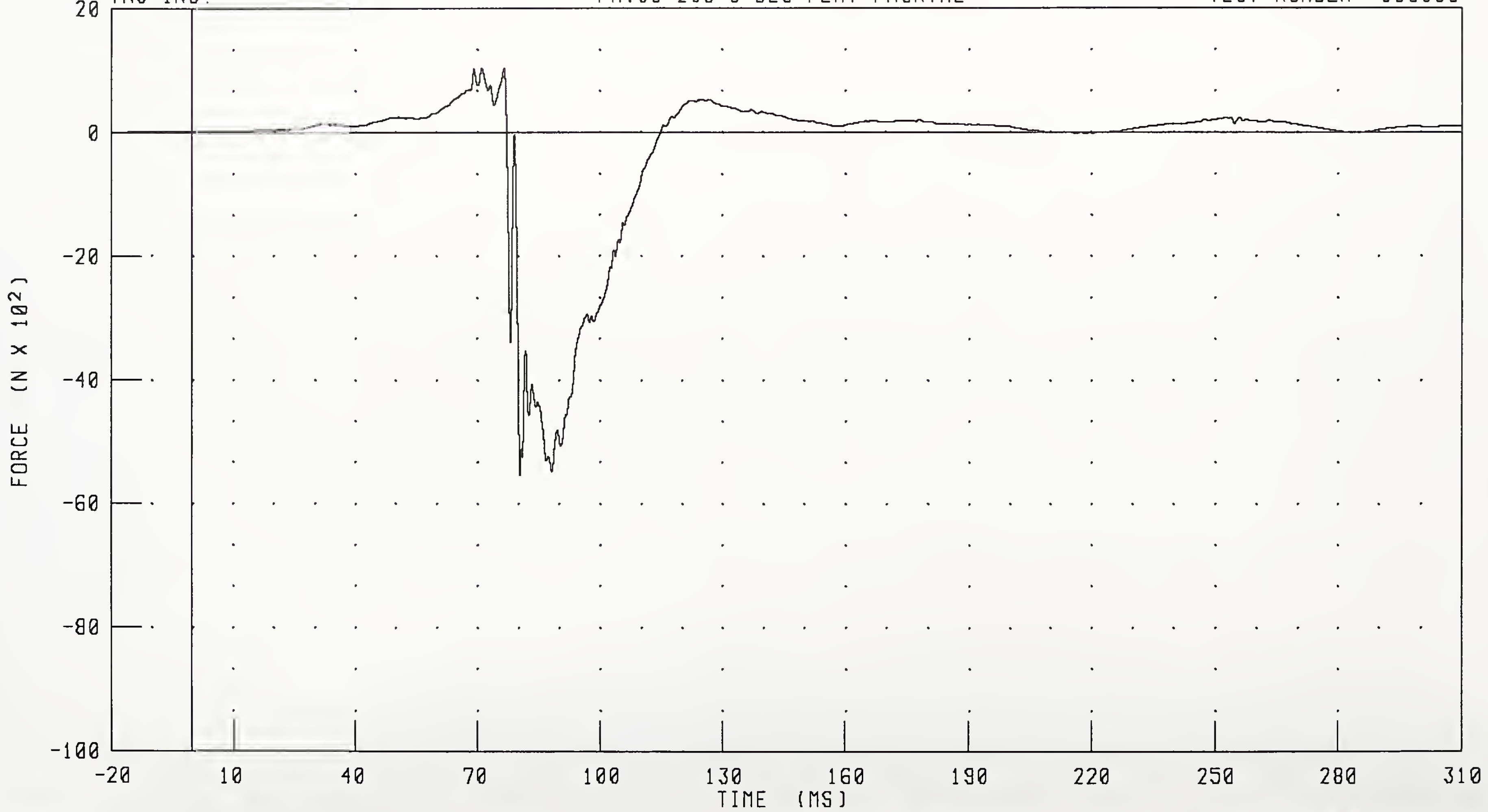
RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST DEFLECTION
TRC INC. FMVSS 208 0 DEG FLAT FRONTAL TEST NUMBER: 950605



CHANNEL: CSTXD2 FILTER: CH. CLASS 180 PEAK DATA: 0.04 MM @ 34.40 MS; -28.22 MM @ 102.32 MS

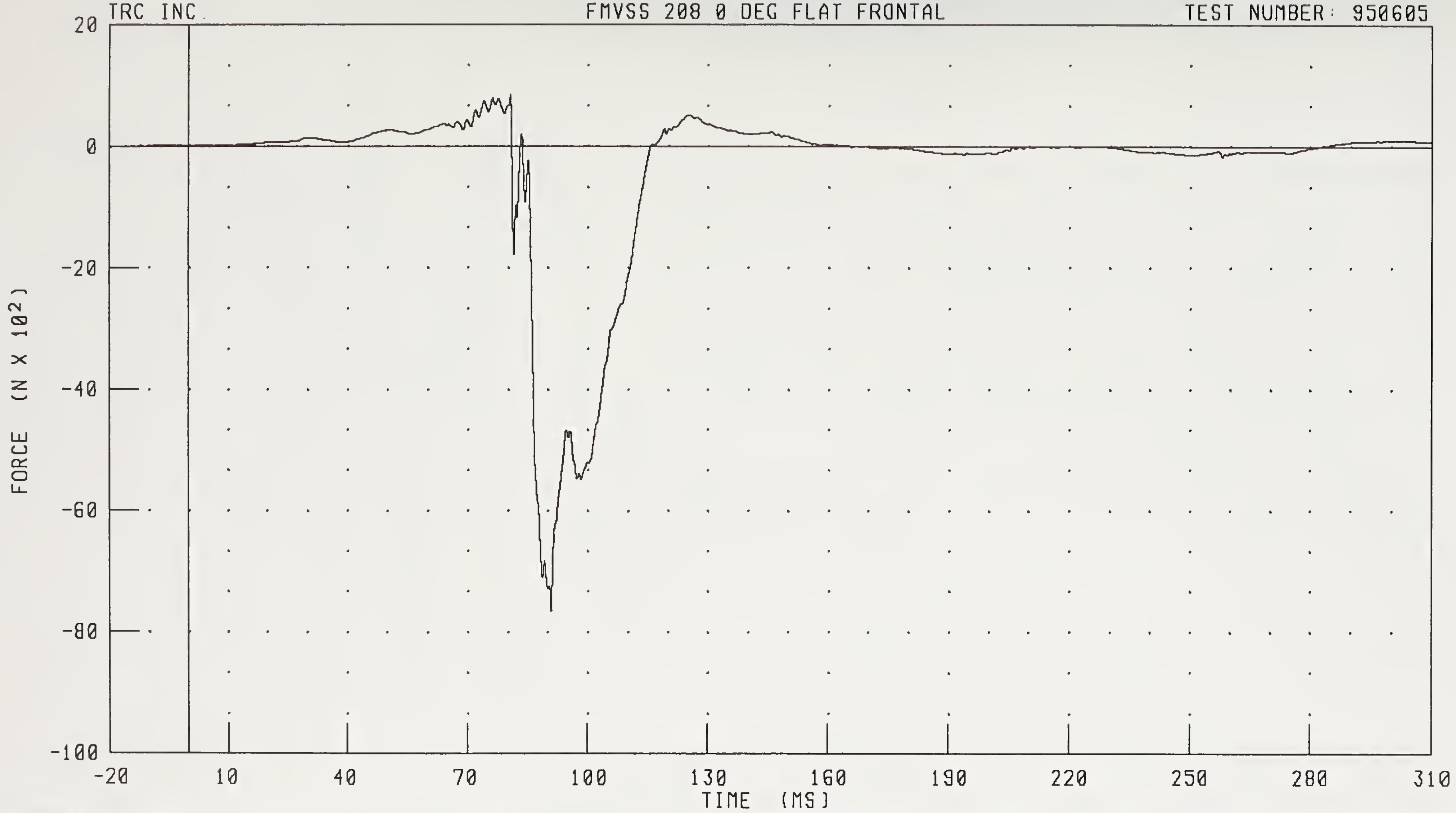
RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER LEFT FEMUR FORCE

TRC INC. FMVSS 208 0 DEG FLAT FRONTAL TEST NUMBER: 950605



CHANNEL: LFMF2 FILTER: CH. CLASS 600 PEAK DATA: 1032.25 N @ 69.28 MS; -5535.98 N @ 80.48 MS

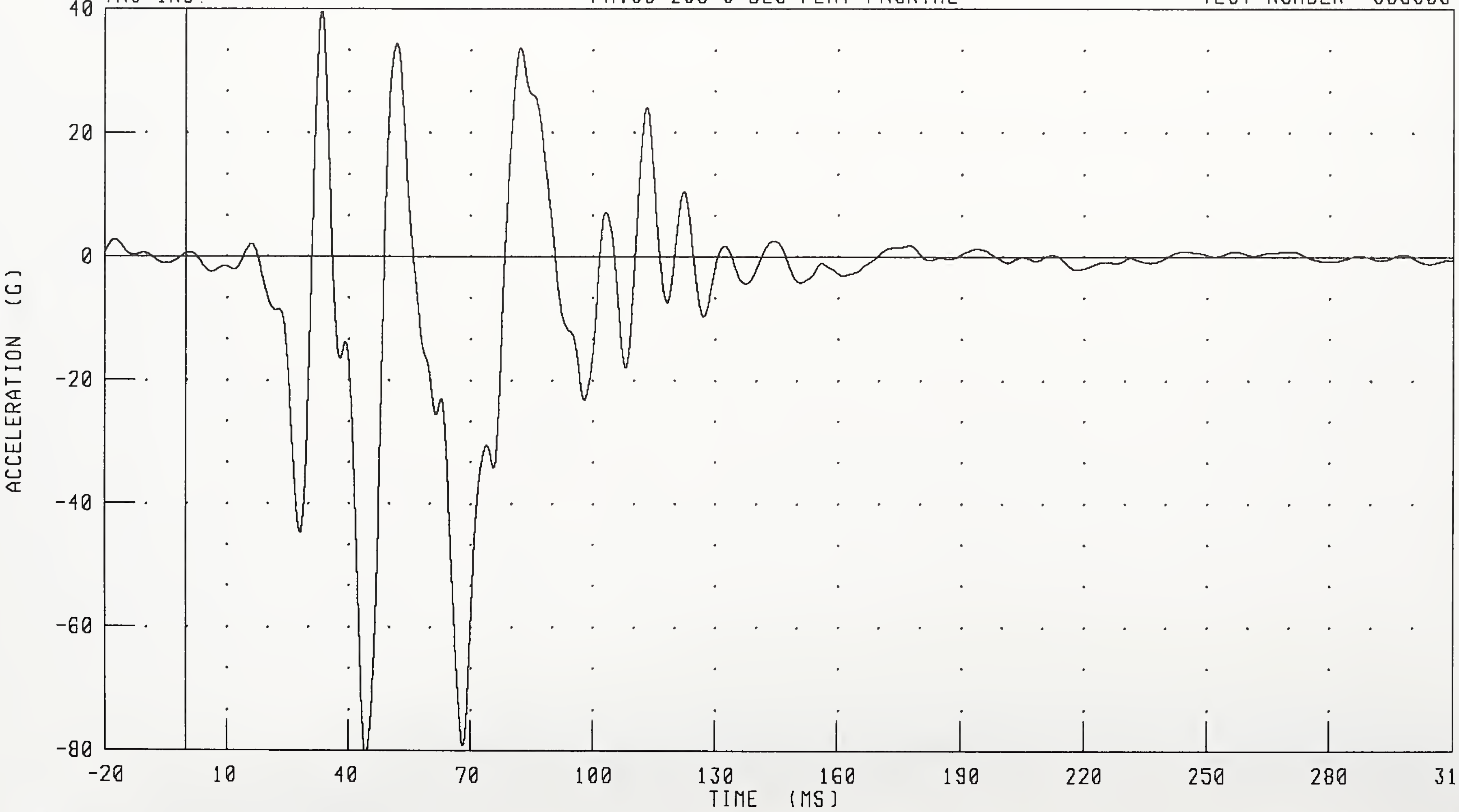
RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER RIGHT FEMUR FORCE



CHANNEL: RFMF2 FILTER: CH. CLASS 600 PEAK DATA: 839.25 N @ 80.64 MS; -7663.67 N @ 90.96 MS

RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
LEFT BRAKE CALIPER X-AXIS ACCELERATION

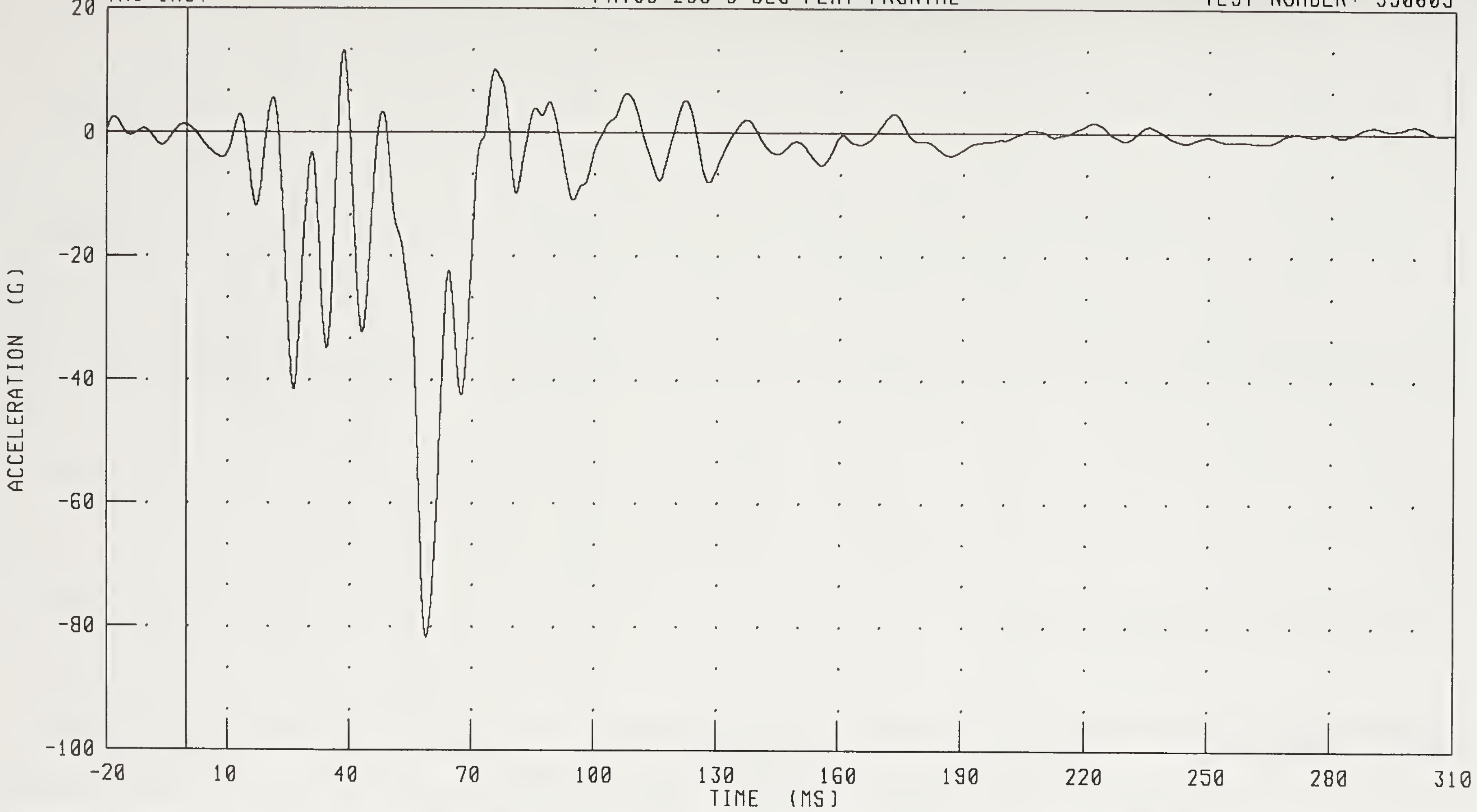
TRC INC. FMVSS 208 0 DEG FLAT FRONTAL TEST NUMBER: 950605



CHANNEL: BCLXG1 FILTER: CH. CLASS 60 PEAK DATA: 39.50 G @ 33.44 MS; -80.64 G @ 44.24 MS

RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
RIGHT BRAKE CALIPER X-AXIS ACCELERATION

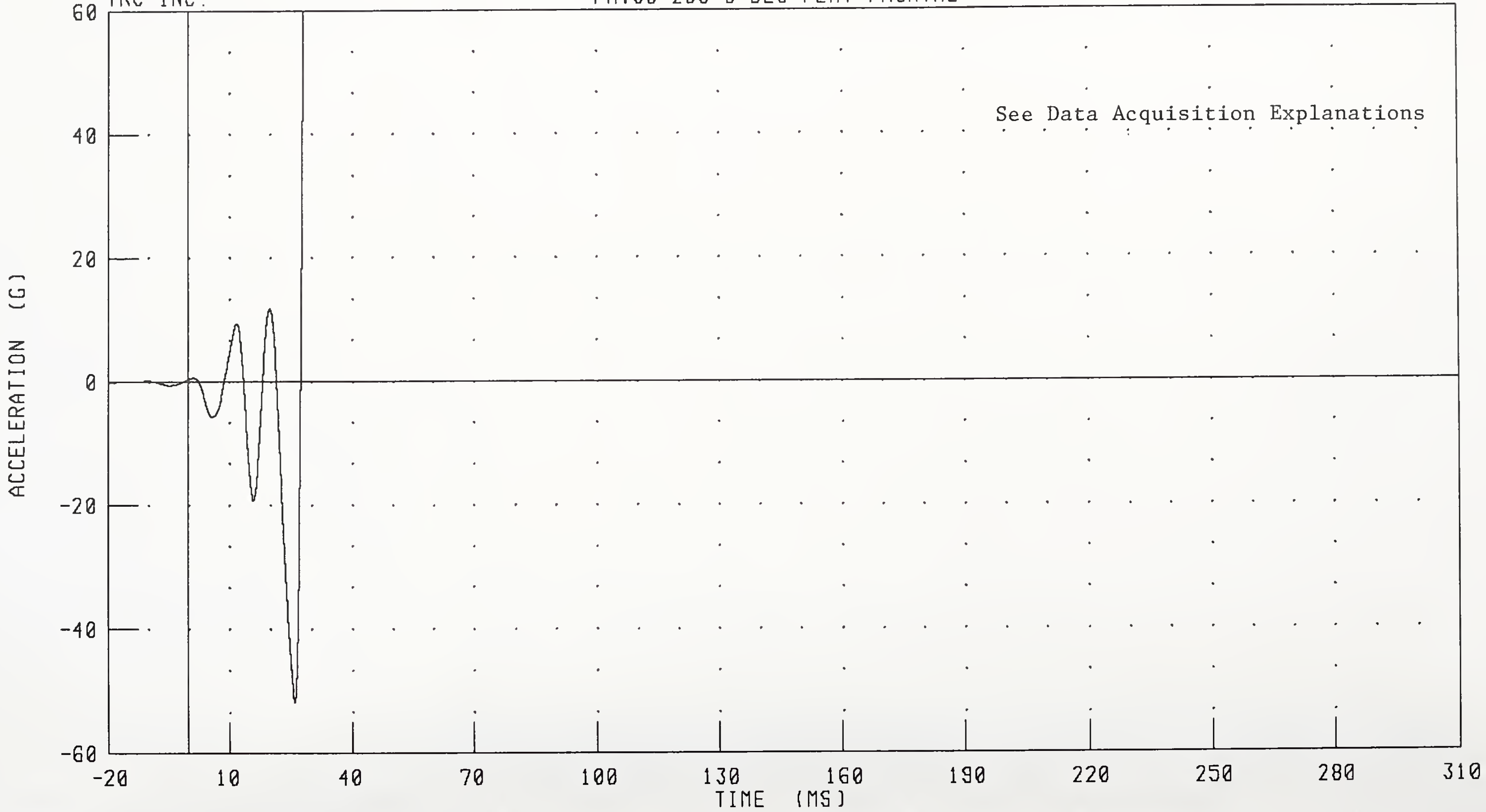
TRC INC.
FMVSS 208 0 DEG FLAT FRONTAL
TEST NUMBER: 950605



CHANNEL: BCRXG1 FILTER: CH. CLASS 60

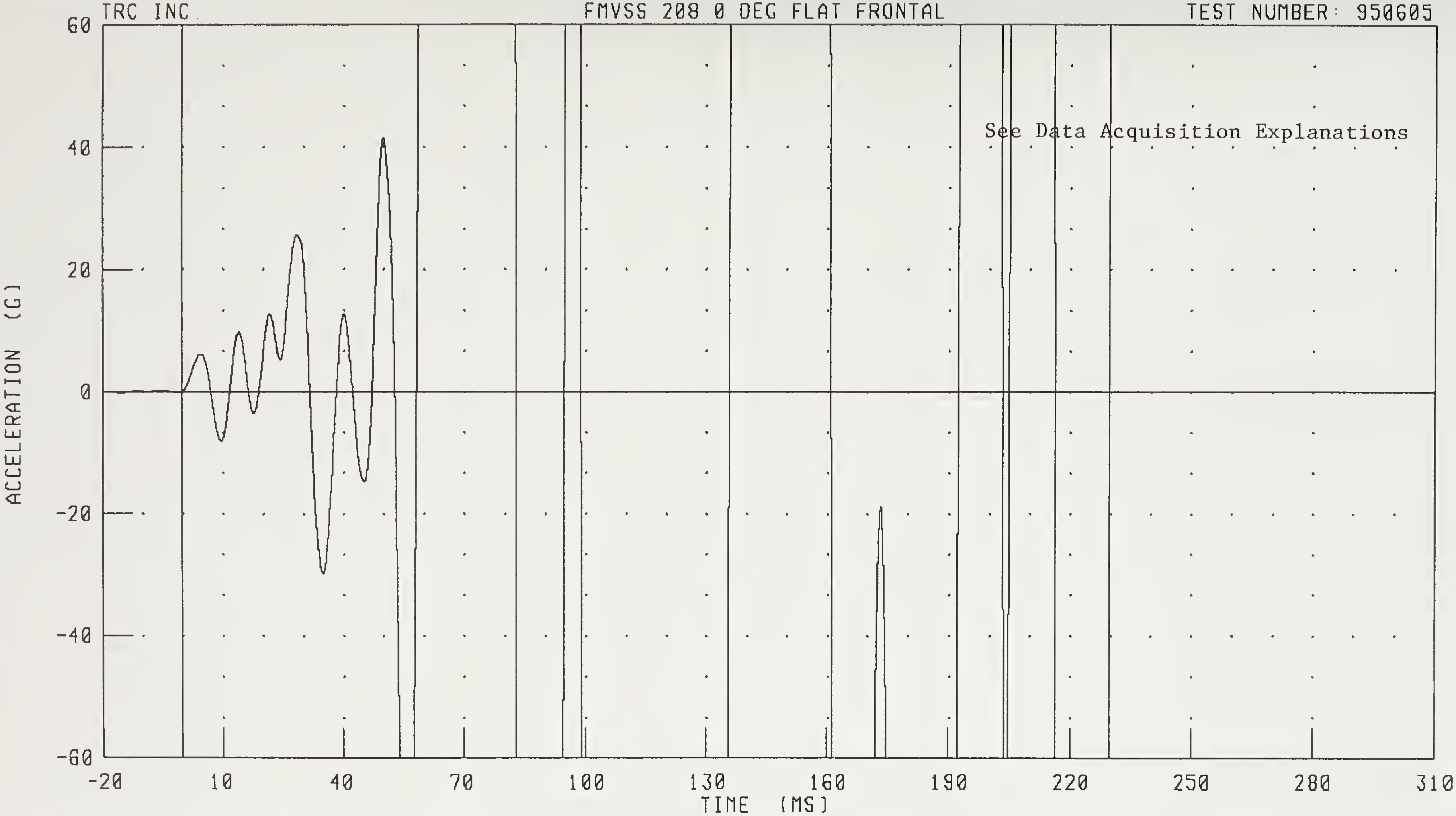
PEAK DATA: 13.23 G @ 38.40 MS; -81.78 G @ 58.80 MS

RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
FRONT BULKHEAD CENTER X-AXIS ACCELERATION
TRC INC. FMVSS 208 0 DEG FLAT FRONTAL TEST NUMBER: 950605



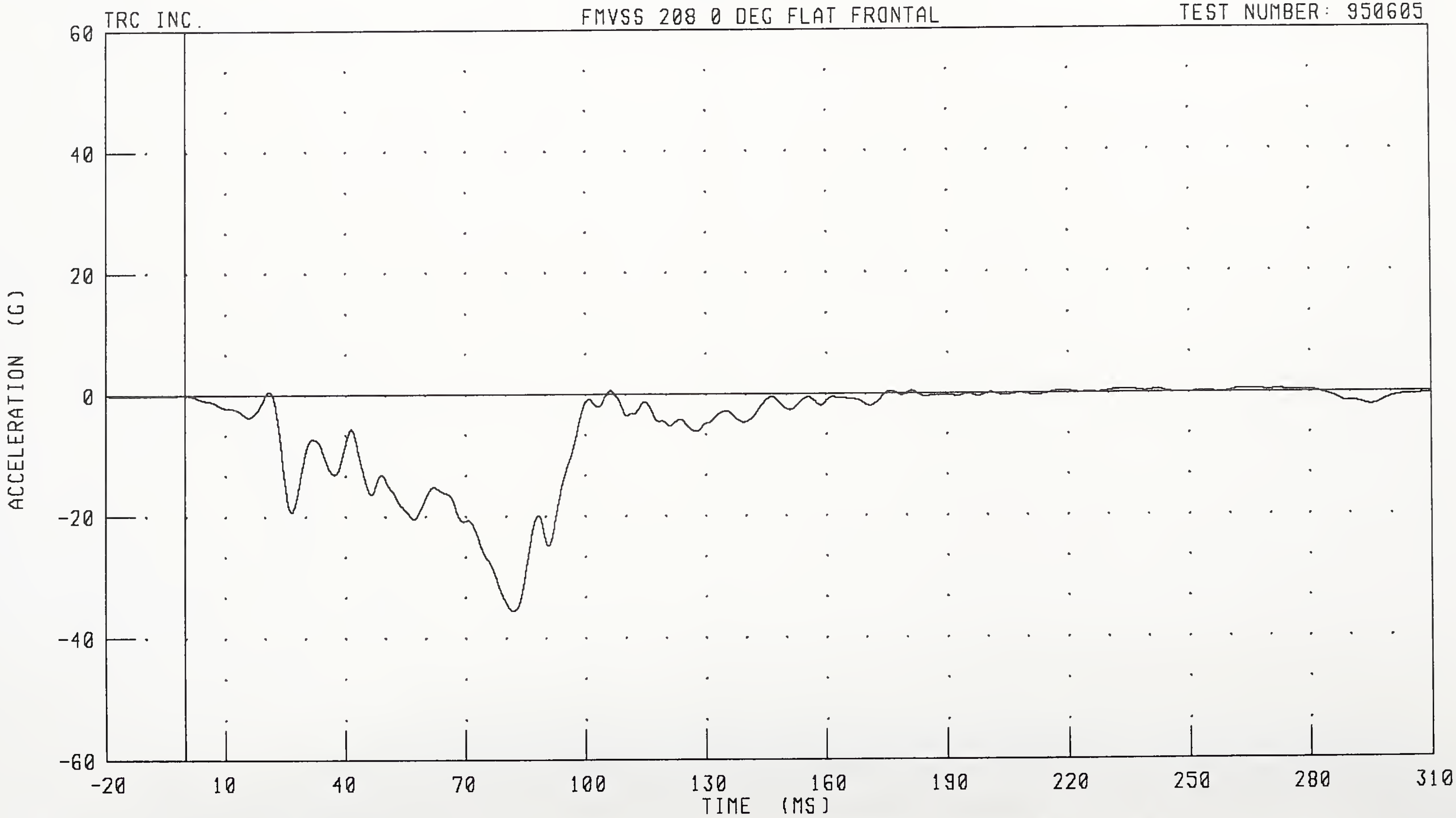
CHANNEL: FFCXG1 FILTER: CH. CLASS 60 PEAK DATA: 1041.96 G @ 34.80 MS; -51.78 G @ 25.92 MS

RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
FRONT BULKHEAD CENTER Z-AXIS ACCELERATION
FMVSS 208 0 DEG FLAT FRONTAL



CHANNEL: FFCZG1 FILTER: CH. CLASS 60 PEAK DATA: 1084.62 G @ 211.28 MS; -1051.96 G @ 103.84 MS

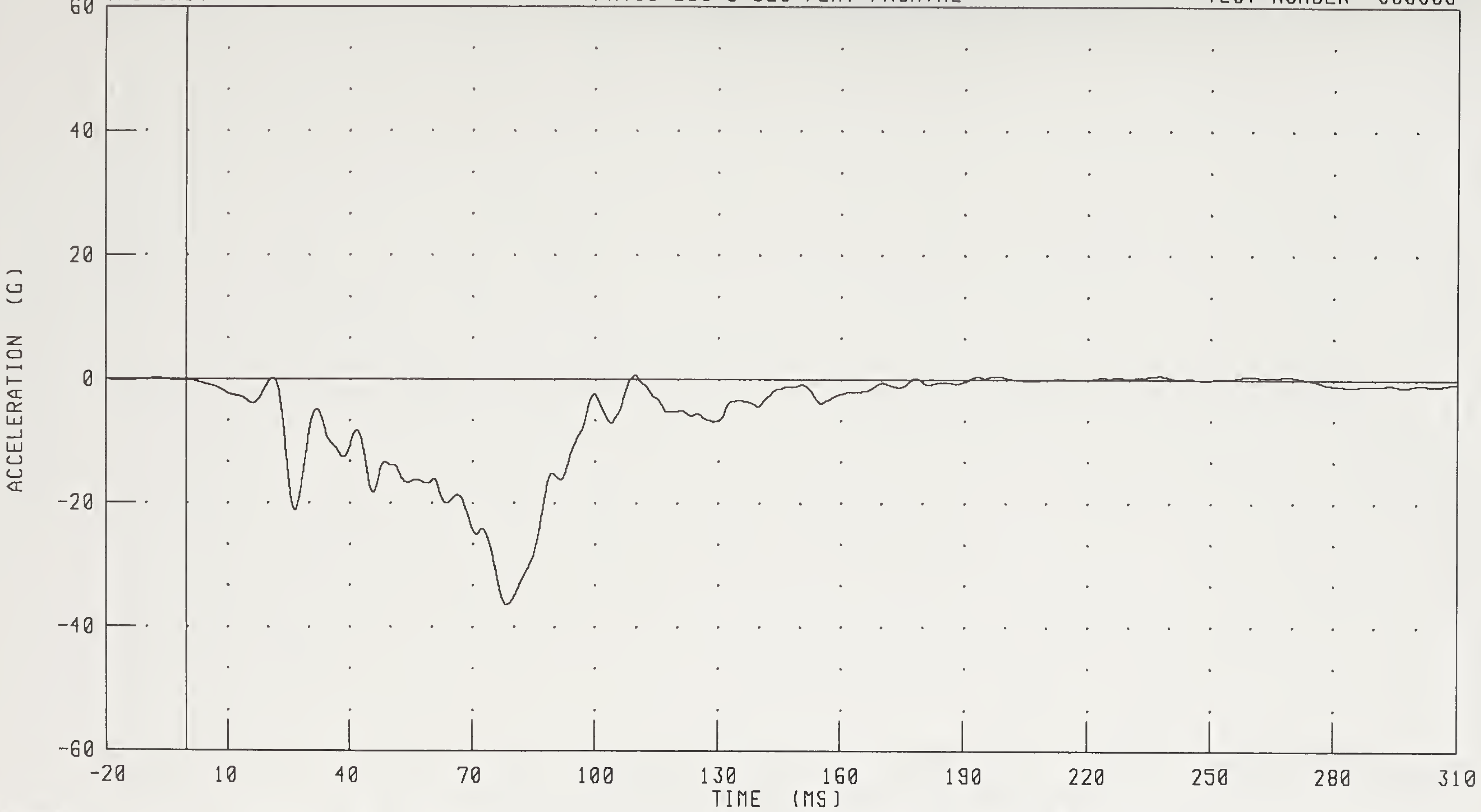
RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
LEFT SEAT CROSSMEMBER X-AXIS ACCELERATION
FMVSS 208 0 DEG FLAT FRONTAL
TEST NUMBER: 950605



CHANNEL: TLFXG1   FILTER: CH. CLASS 60   PEAK DATA: 0.65 G @ 106.40 MS; -35.59 G @ 81.92 MS

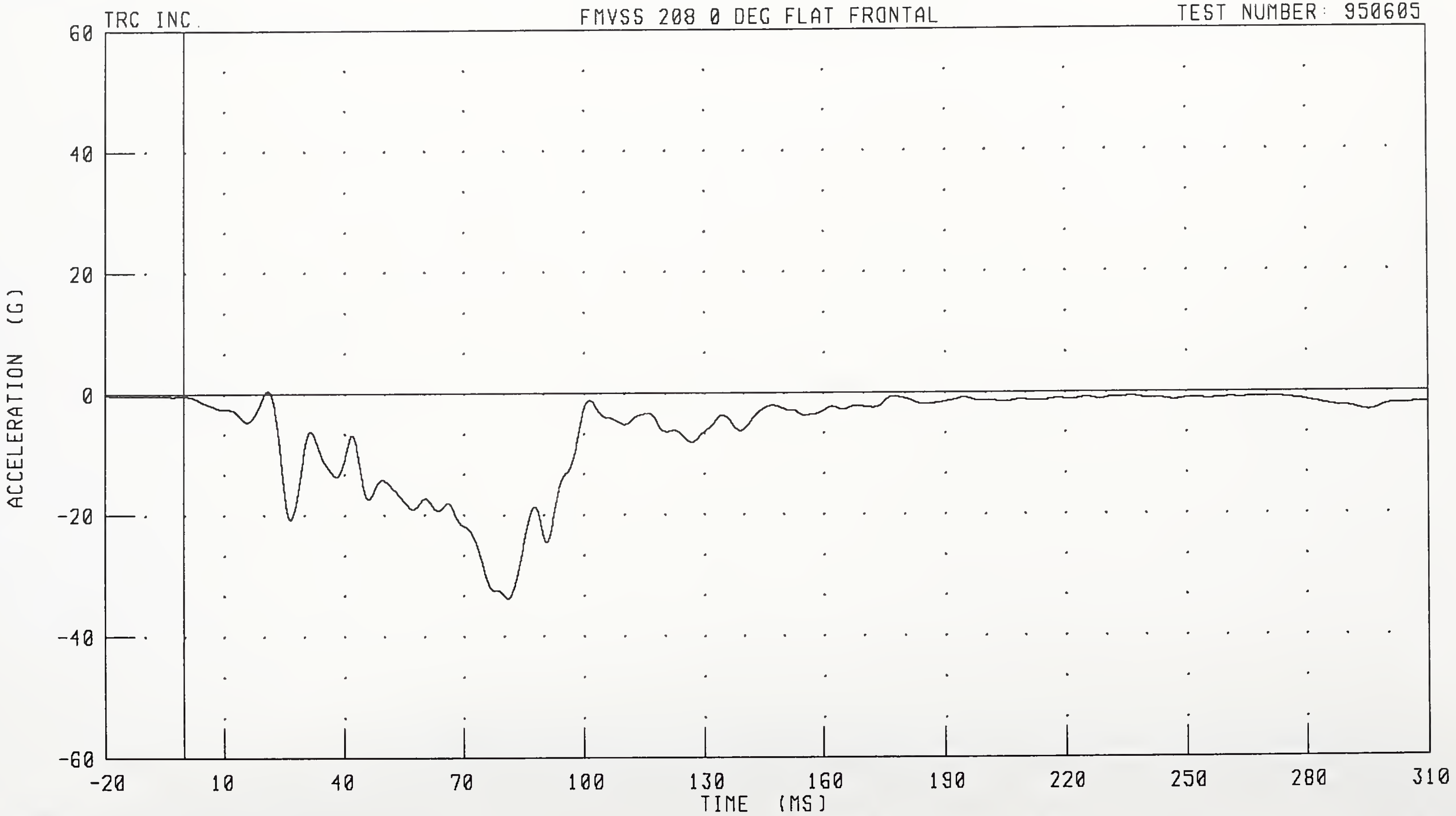
RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
RIGHT SEAT CROSSMEMBER X-AXIS ACCELERATION

TRC INC. FMVSS 208 0 DEG FLAT FRONTAL TEST NUMBER: 950605



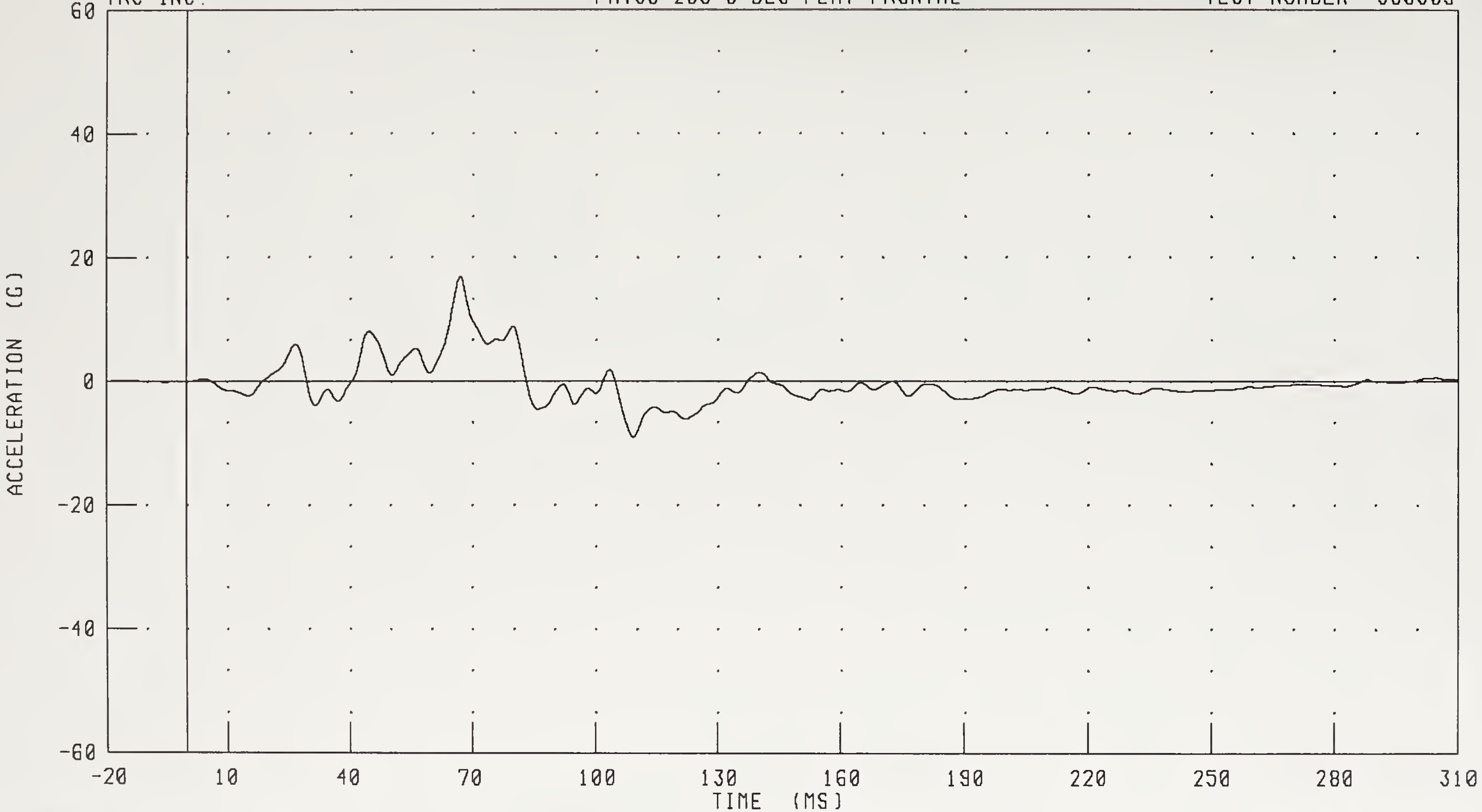
CHANNEL: TRFXG1 FILTER: CH. CLASS 60 PEAK DATA: 0.75 G @ 109.84 MS; -36.37 G @ 78.32 MS

RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
REAR BATTERY COMPARTMENT X-AXIS ACCELERATION
FMVSS 208 0 DEG FLAT FRONTAL
TEST NUMBER: 950605



CHANNEL: TFCXG1 FILTER: CH. CLASS 60

PEAK DATA: 0.47 G @ 21.04 MS; -33.83 G @ 81.12 MS

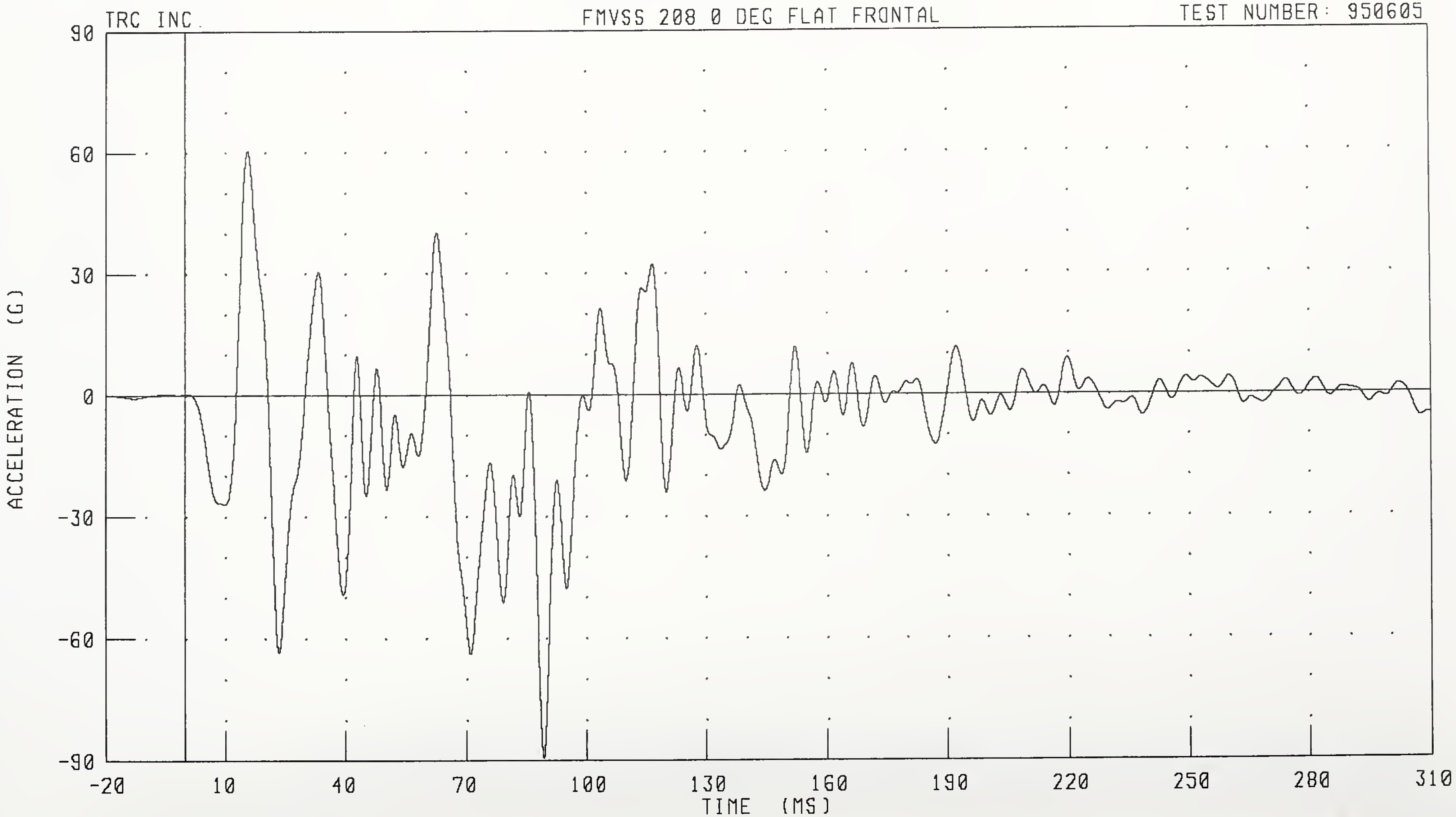


RENAISSANCE CARS TROPICA PILOT VEHICLE NO. 1 INTO FLAT FRONTAL BARRIER
REAR BATTERY COMPARTMENT Z-AXIS ACCELERATION

TRC INC. FMVSS 208 0 DEG FLAT FRONTAL TEST NUMBER: 950605

CHANNEL: TFCZG1 FILTER: CH. CLASS 60 PEAK DATA: 16.95 G @ 67.04 MS; -9.05 G @ 109.12 MS

RENAISSANCE CARS TROPICA PILOT VEHICLE NO 1 INTO FLAT FRONTAL BARRIER
DASH PANEL CENTER X-AXIS ACCELERATION
FMVSS 208 0 DEG FLAT FRONTAL



CHANNEL: DPCXG1 FILTER: CH. CLASS 60 PEAK DATA: 60.59 G @ 15.60 MS; -89.50 G @ 89.28 MS

Appendix C

Dummy Certification Data

Pre-test Certification Data

Driver Dummy S/N: 083

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III EXTERNAL DIMENSIONS
083 HUMANOID 18-MAY-95
TRC INC. TEST NO: 83C3ED1 572E SN083 EXT.DIMENSION CAL03

TEST PARAMETER	(DIMEN.)	SPECIFICATION	TEST RESULTS
LOCATION FOR CHEST CIRCUMFERENCE	(AA)	429 - 434 MM	432. MM
LOCATION FOR WAIST CIRCUMFERENCE	(BB)	226 - 231 MM	229. MM
CHEST CIRCUMFERENCE	(Y)	970 -1001 MM	983. MM
WAIST CIRCUMFERENCE	(Z)	836 - 866 MM	853. MM
CHEST DEPTH	(O)	213 - 229 MM	216. MM
H-POINT HEIGHT	(C)	84 - 89 MM	89. MM
H-POINT FROM SEATBACK	(D)	135 - 140 MM	140. MM
SKULL CAP TO BACKLINE	(H)	41 - 46 MM	43. MM
TOTAL SITTING HEIGHT	(A)	879 - 889 MM	884. MM
THIGH CLEARANCE	(F)	140 - 155 MM	145. MM
BUTTOCK KNEE LENGTH	(K)	579 - 605 MM	597. MM
BUTTOCK POPLITEAL LENGTH	(N)	452 - 478 MM	470. MM
POPLITEAL HEIGHT	(L)	429 - 455 MM	439. MM
KNEE PIVOT HEIGHT	(M)	485 - 500 MM	493. MM
FOOT LENGTH	(P)	252 - 267 MM	259. MM
FOOT BREADTH	(W)	91 - 107 MM	102. MM
SHOULDER PIVOT FROM BACKLINE	(E)	84 - 94 MM	89. MM
SHOULDER BREADTH	(V)	422 - 437 MM	429. MM
SHOULDER PIVOT HEIGHT	(B)	506 - 521 MM	516. MM
ELBOW REST HEIGHT	(J)	191 - 211 MM	208. MM
SHOULDER-ELBOW LENGTH	(I)	330 - 345 MM	343. MM
BACK OF ELBOW TO WRIST PIVOT	(G)	290 - 305 MM	297. MM

DUMMY MEETS SPECIFICATIONS
TECHNICIAN Pete Fo

RUN NUMBER: 051995.0828

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III 18-MAY-95

TRC INC. TEST NO: 83C3HD1 572E SN083 HEAD DROP CAL 03

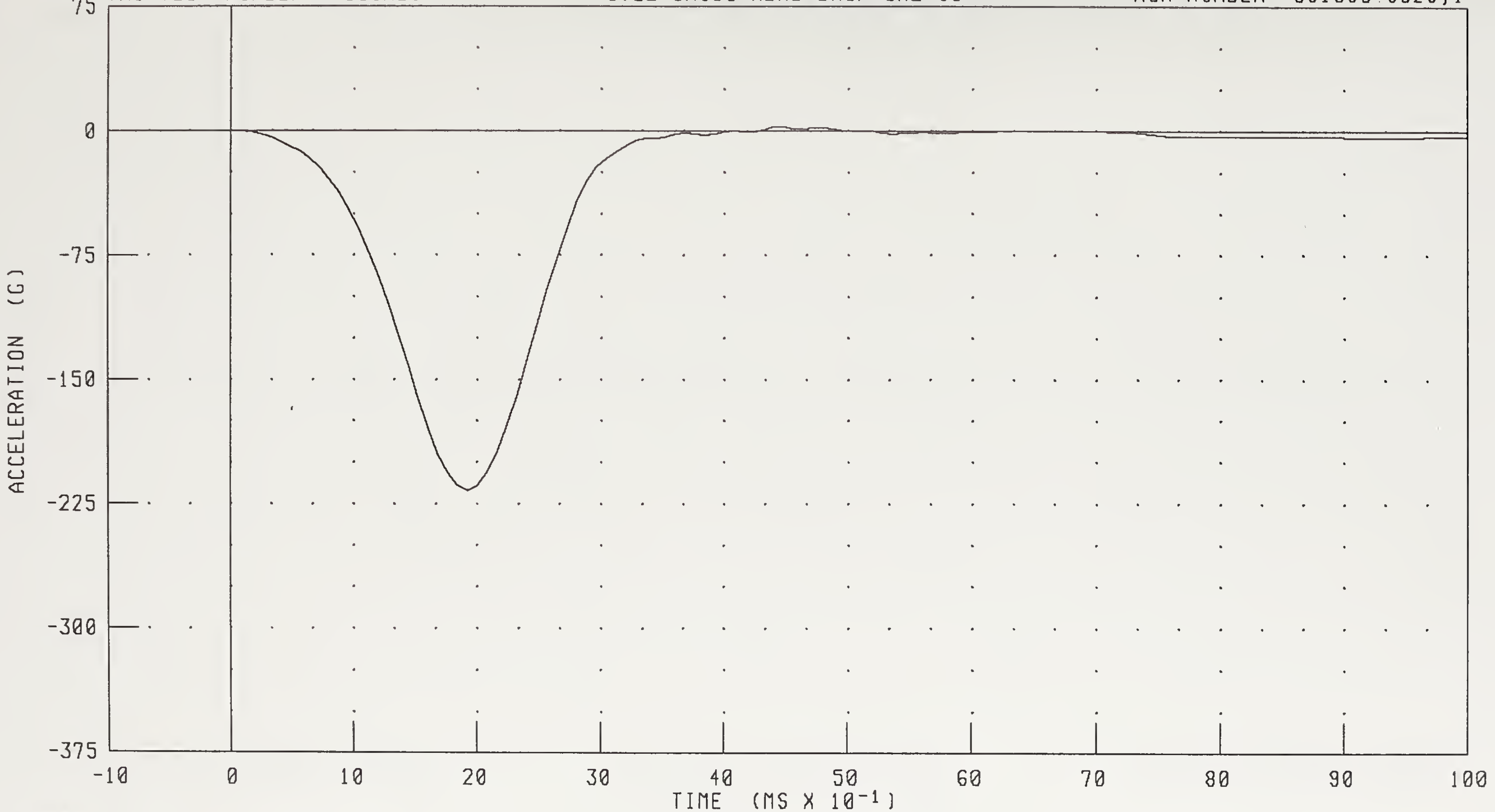
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	50.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	252.54 G
PEAK LATERAL ACCELERATION	15 G MAX	2.11 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN________________ RUN NUMBER: 051895.0922;1

PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION X AXIS

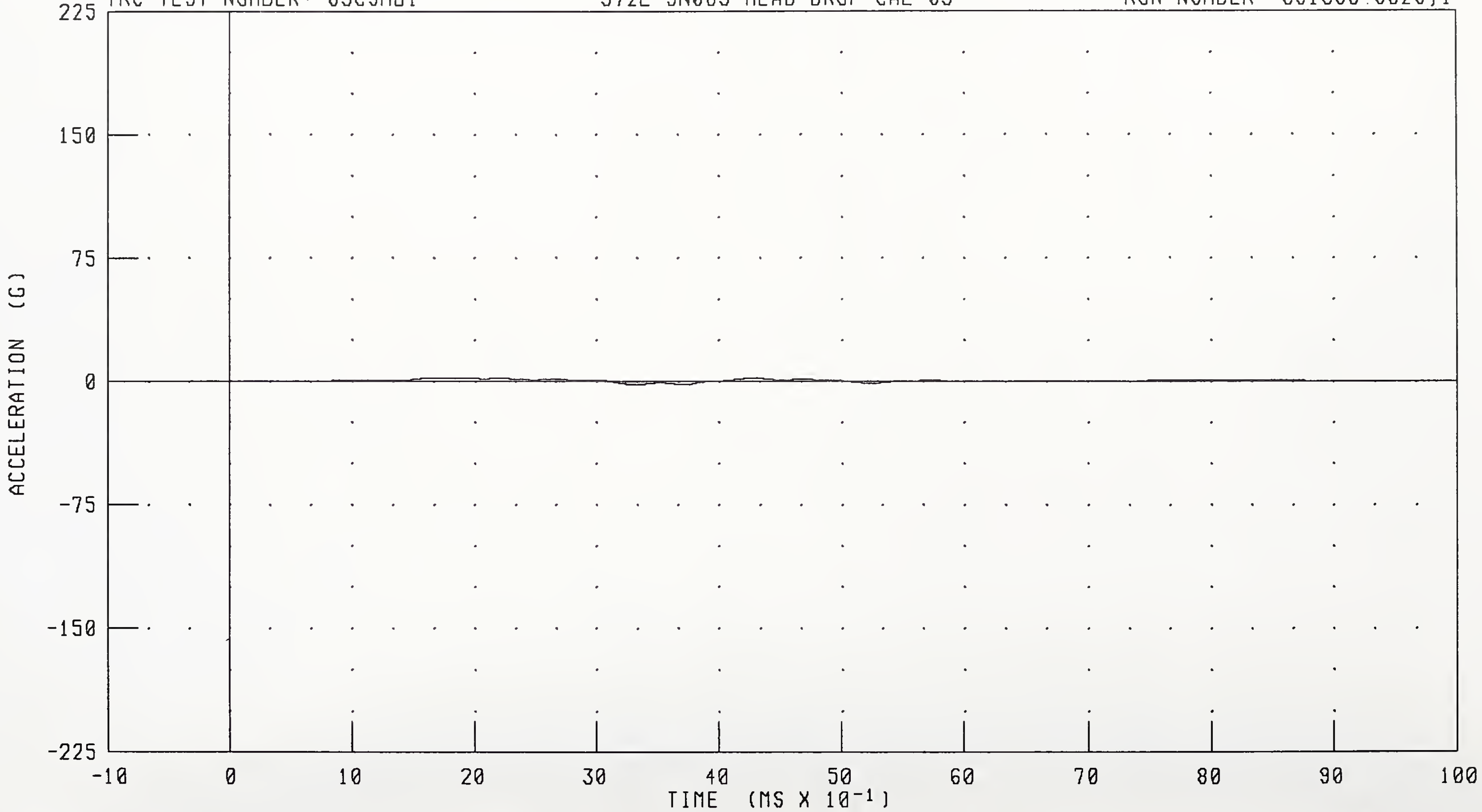
TRC TEST NUMBER: 83C3H01 572E SN083 HEAD DROP CAL 03 RUN NUMBER: 051895.0923;1



CHANNEL: HEDXG FILTER: CH. CLASS 1000 PEAK DATA: 2.24 G @ 4.48 MS; -216.95 G @ 1.92 MS

PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Y AXIS

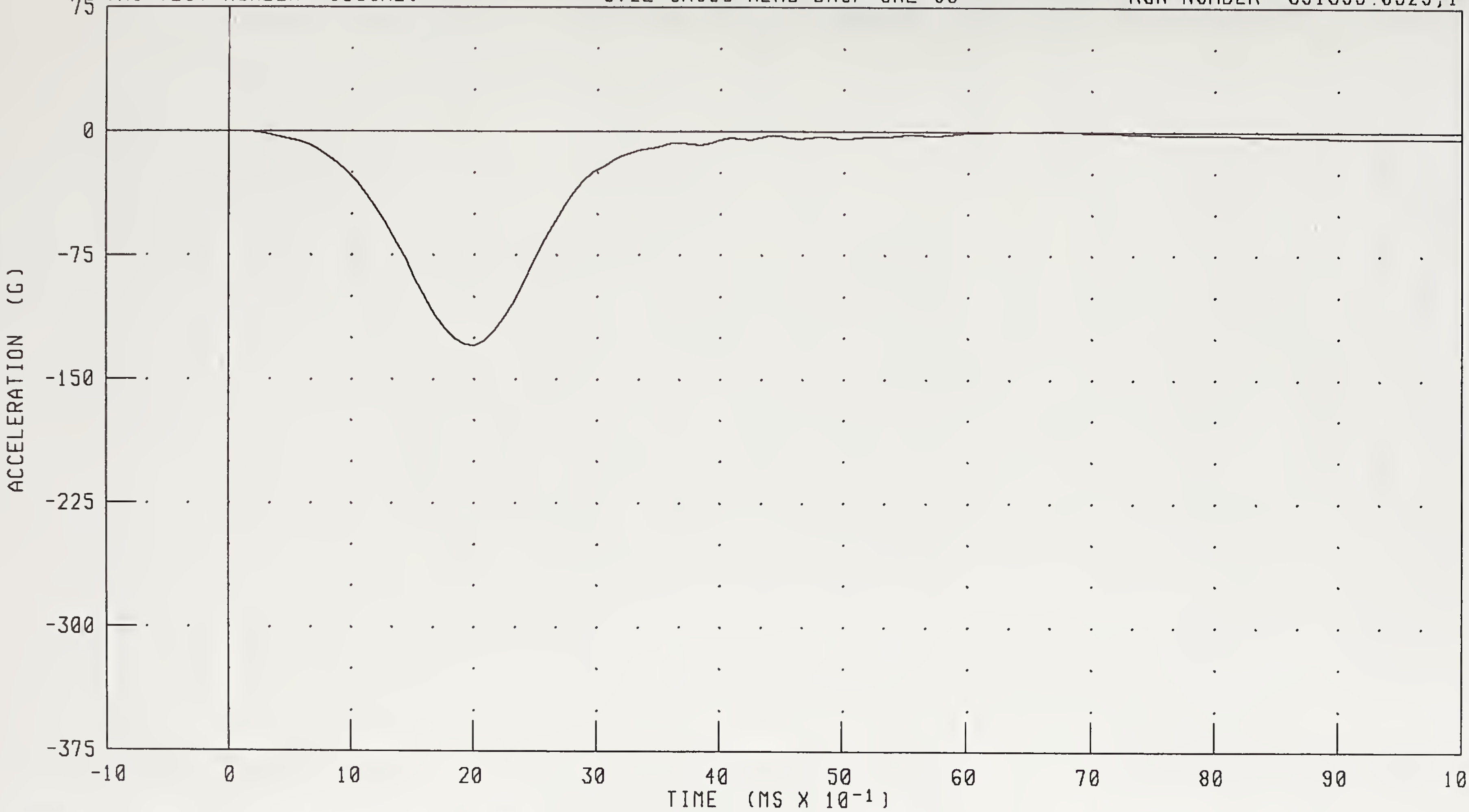
TRC TEST NUMBER: 83C3HD1 572E SN083 HEAD DROP CAL 03 RUN NUMBER: 051895.0923;1



CHANNEL: HEDYG FILTER: CH. CLASS 1000 PEAK DATA: 2.11 G @ 1.84 MS; -1.89 G @ 3.68 MS

PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Z AXIS

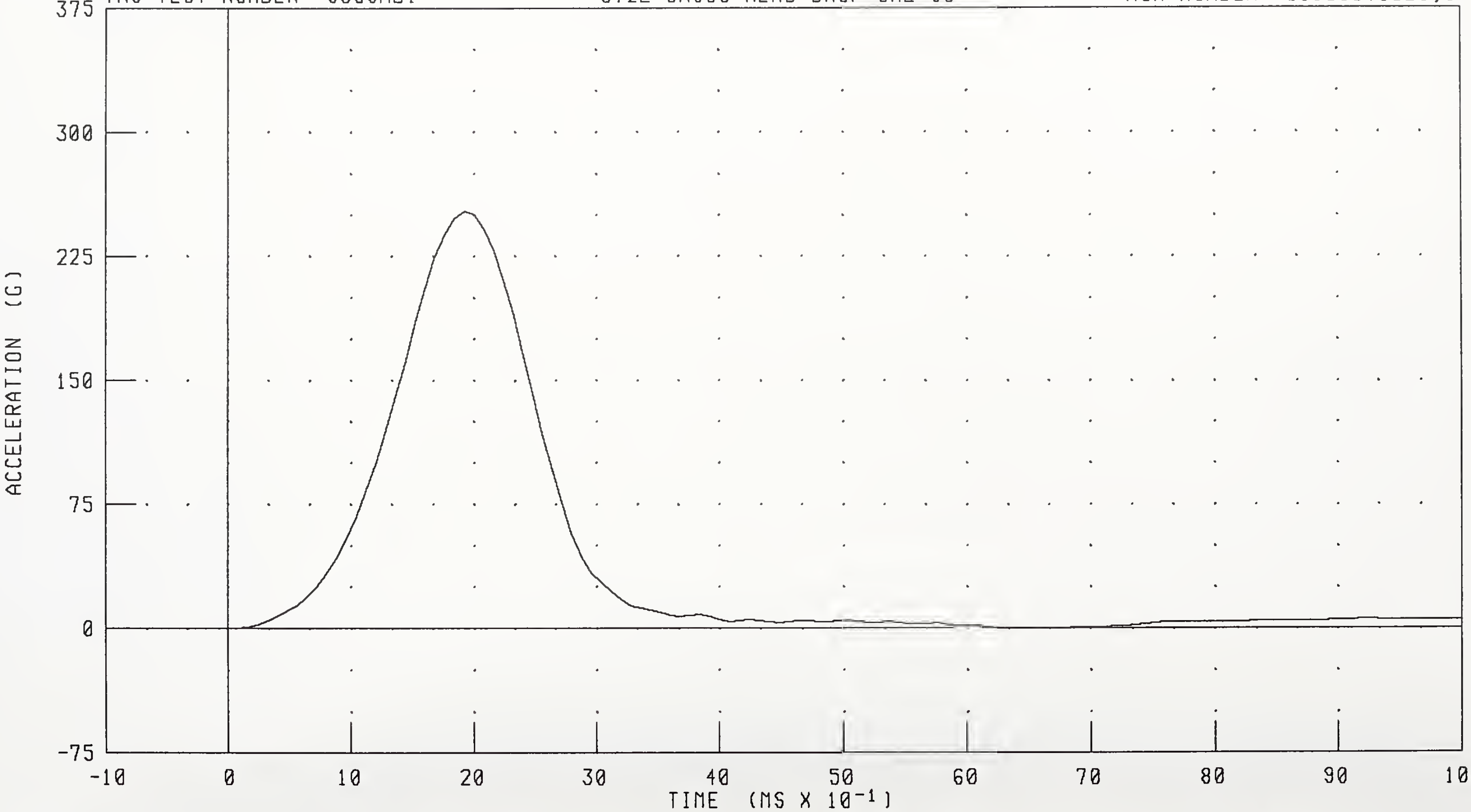
TRC TEST NUMBER: 83C3H01
572E SN083 HEAD DROP CAL 03
RUN NUMBER: 051895.0923;1



CHANNEL: HEDZG
FILTER: CH. CLASS 1000
PEAK DATA: 0.29 G @ 6.72 MS; -129.89 G @ 2.00 MS

PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: 83C3HD1
572E SN083 HEAD DROP CAL 03
RUN NUMBER: 051895.0923;1



CHANNEL: HEDRG FILTER: CH. CLASS 1000 PEAK DATA: 252.54 G @ 1.92 MS; 0.04 G @ -0.32 MS

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

HYBRID III 18-MAY-95

TRC INC. TEST NO: 83C3NF1 572E SN083 NECK FLEXION CAL03

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	50.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	6.99 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	22.55 G
	20 MS	17.60 - 22.60 G	20.03 G
	30 MS	12.50 - 18.50 G	15.59 G
MAX PENDULUM G		29 G MAX	23.34 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	15.57 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	36.56 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	68.26 DEG.
	TIME	57 - 64 MS	58.80 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	93.13 NM
	TIME	47 - 58 MS	48.96 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	115.92 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	101.44 MS

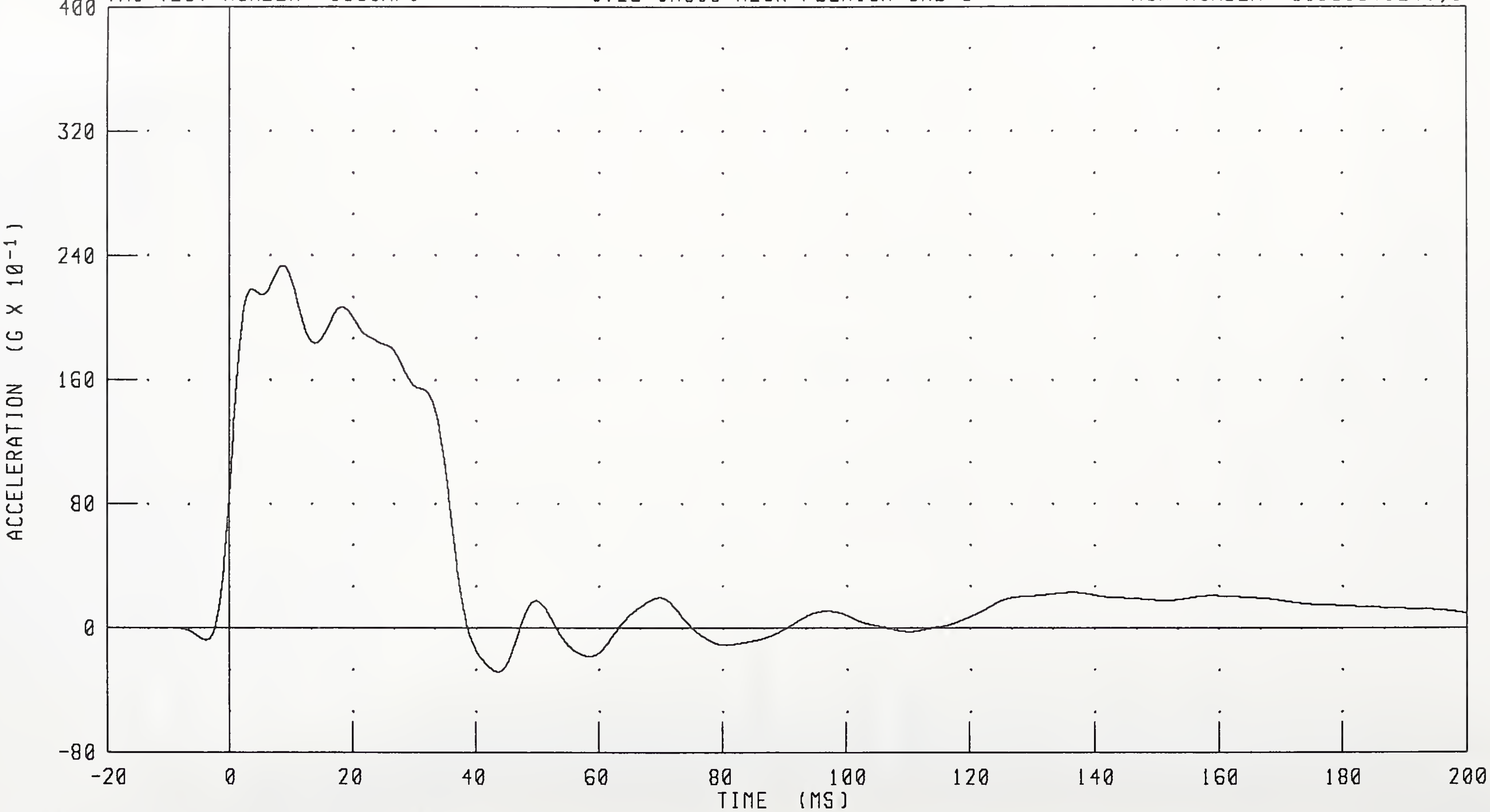
TEST MEETS SPECIFICATIONS

TECHNICIAN Pete

RUN NUMBER: 051895.1243;1

PART 572-E HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION

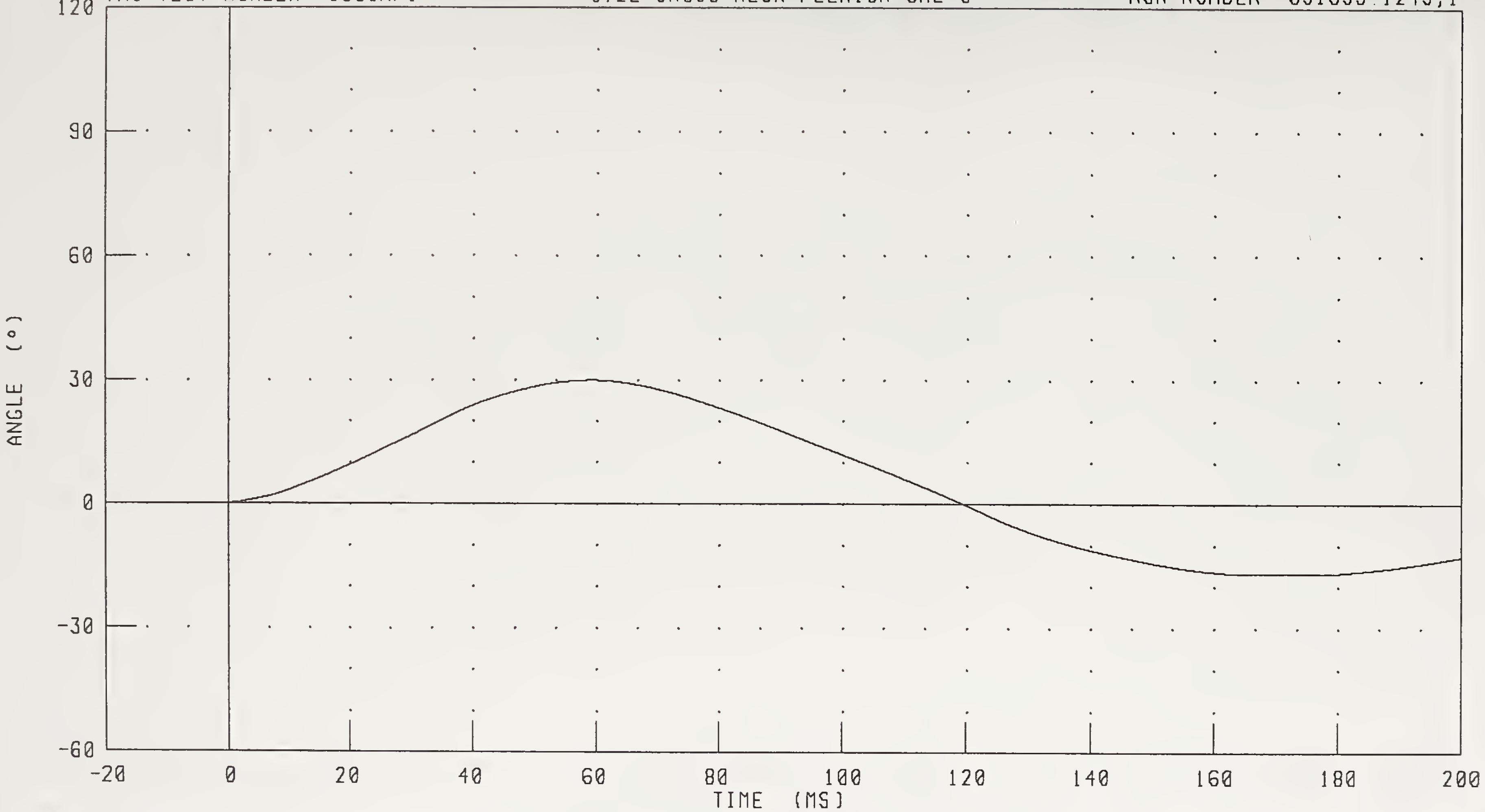
TRC TEST NUMBER: 83C3NF1 572E SN083 NECK FLEXION CAL-3 RUN NUMBER: 051895.1243;1



CHANNEL: PENXG FILTER: CH. CLASS 60 PEAK DATA: 23.35 G @ 8.72 MS; -2.80 G @ 43.60 MS

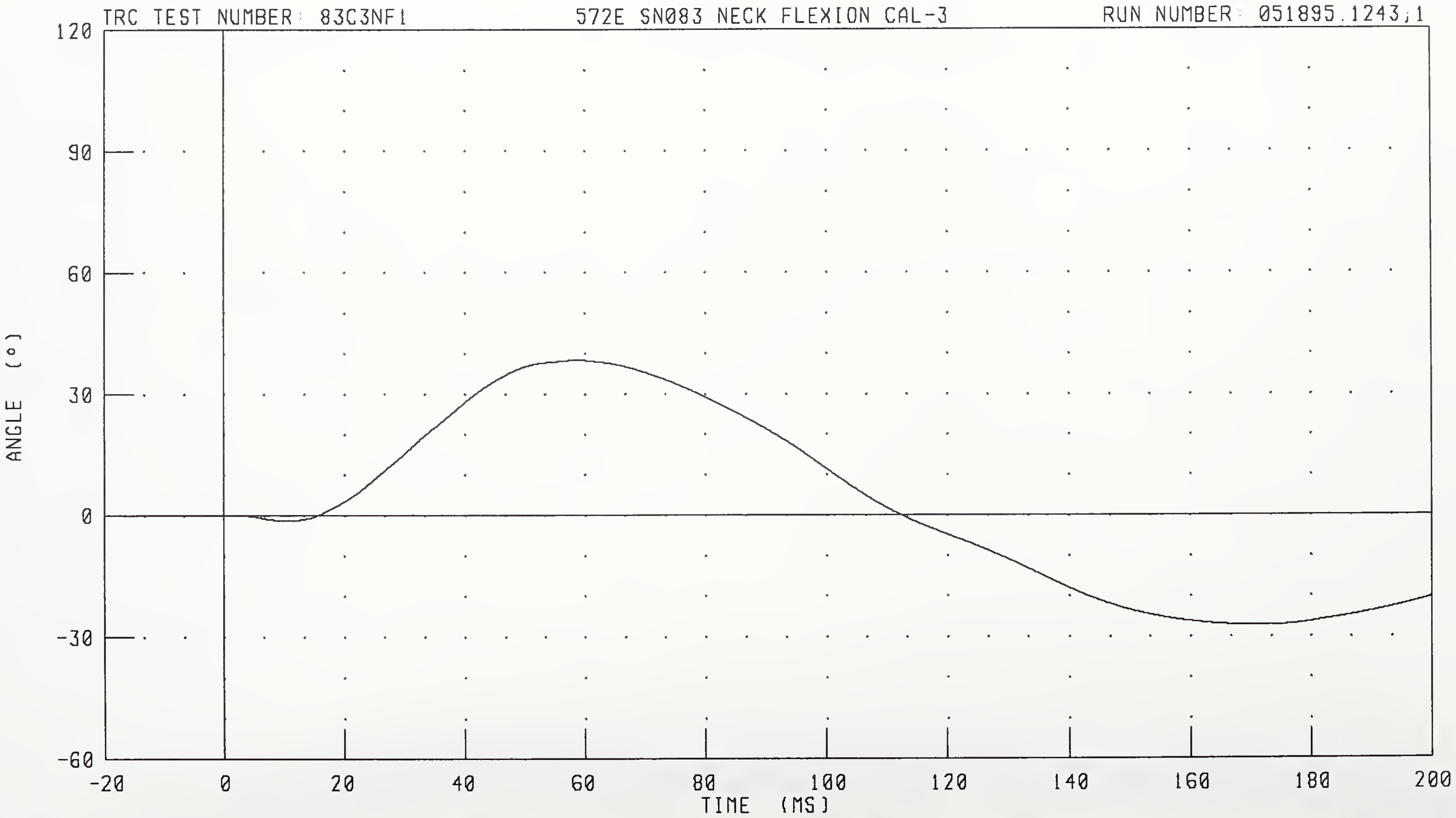
PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 83C3NF1 572E SN083 NECK FLEXION CAL-3 RUN NUMBER: 051895.1243;1



CHANNEL: BETA FILTER: CH CLASS 60 PEAK DATA: 29.91 ° @ 59.20 MS; -16.84 ° @ 169.12 MS

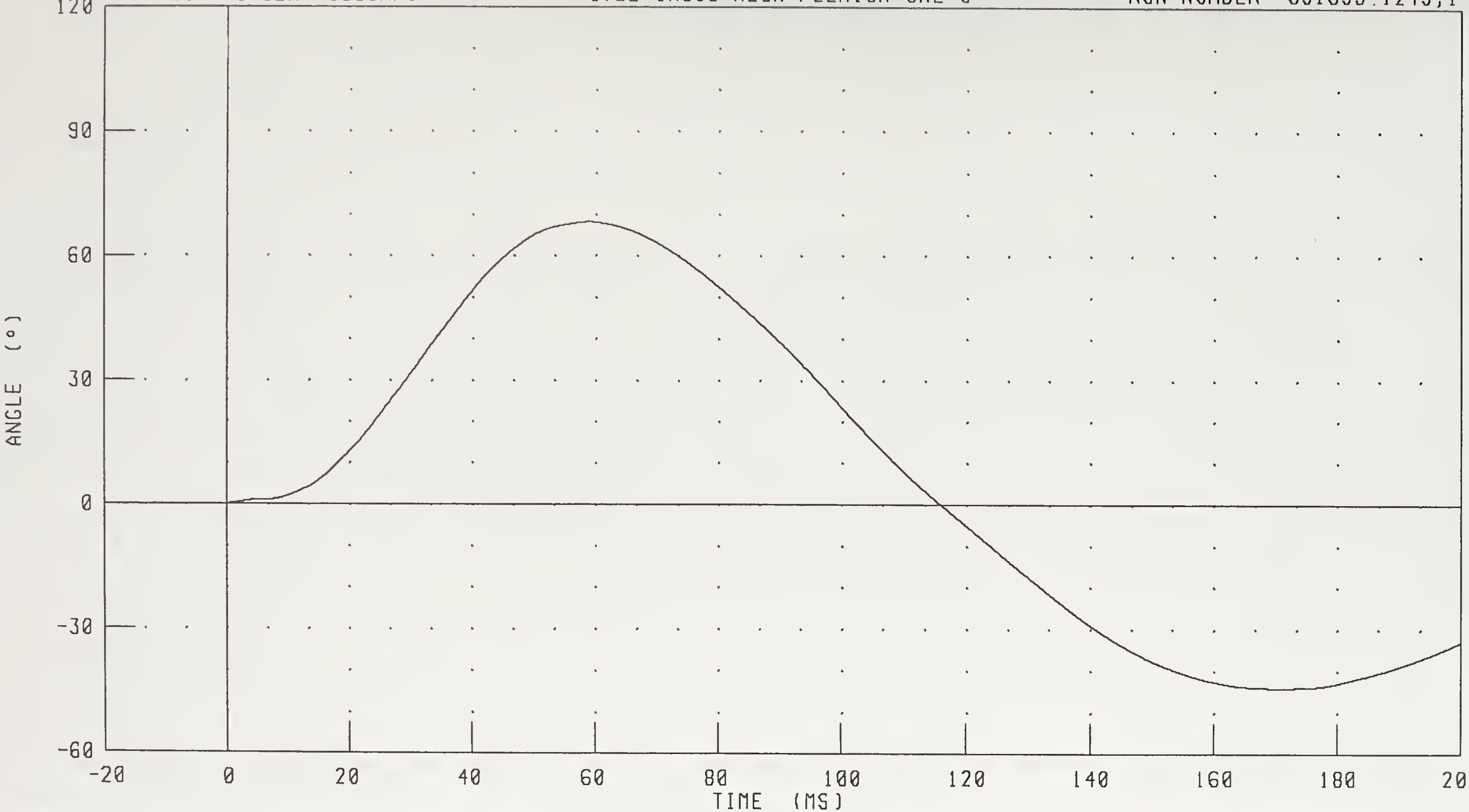
PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE



CHANNEL: THETA FILTER: CH. CLASS 60 PEAK DATA: 38.37 ° @ 58.64 MS; -27.25 ° @ 170.96 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL ROTATION

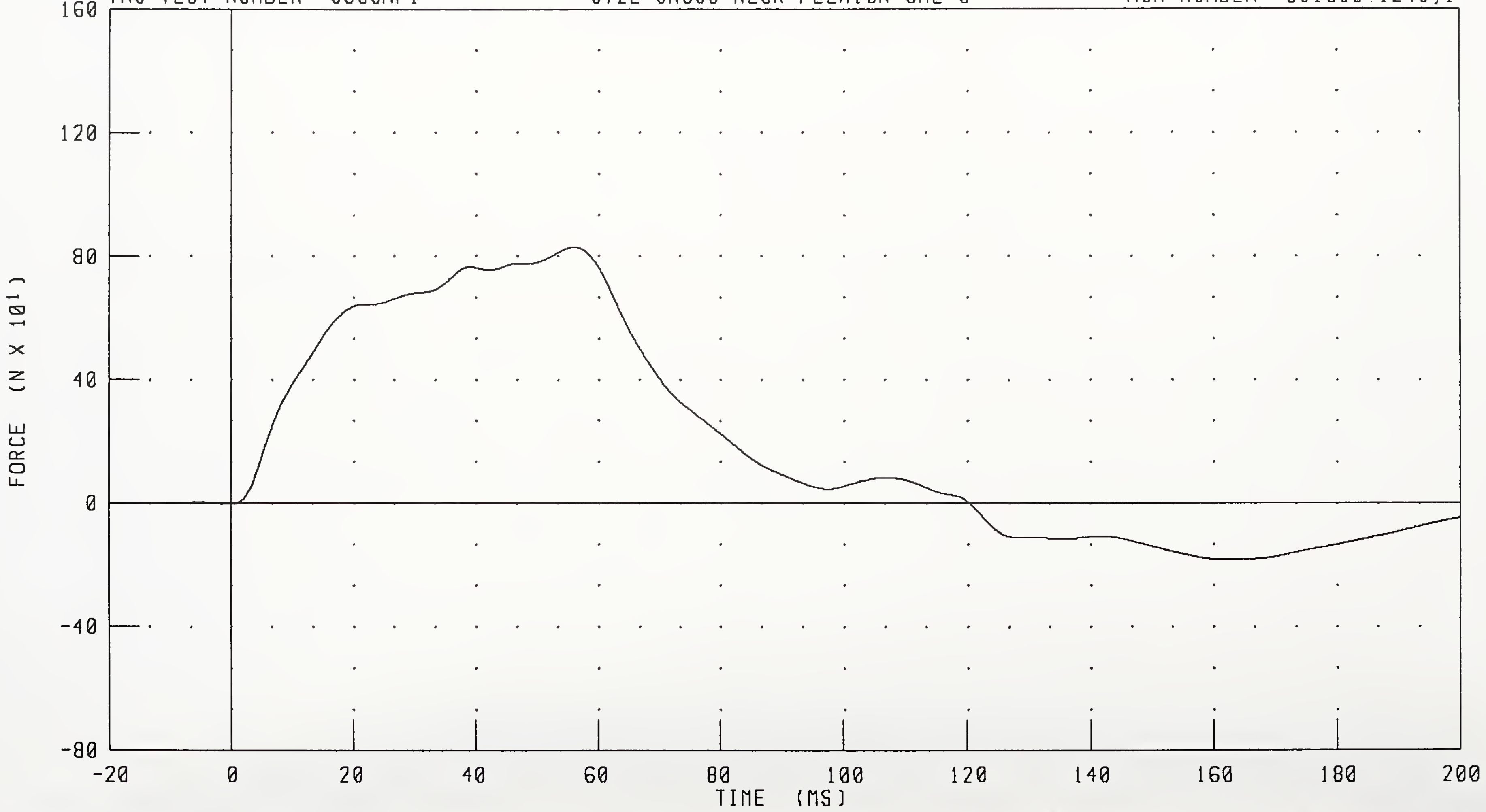
TRC TEST NUMBER: 83C3NF1 572E SN083 NECK FLEXION CAL-3 RUN NUMBER: 051895.1243;1



CHANNEL: TOTAN FILTER: CH. CLASS 60 PEAK DATA: 68.27 ° @ 58.80 MS; -44.09 ° @ 170.80 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK FORCE X AXIS

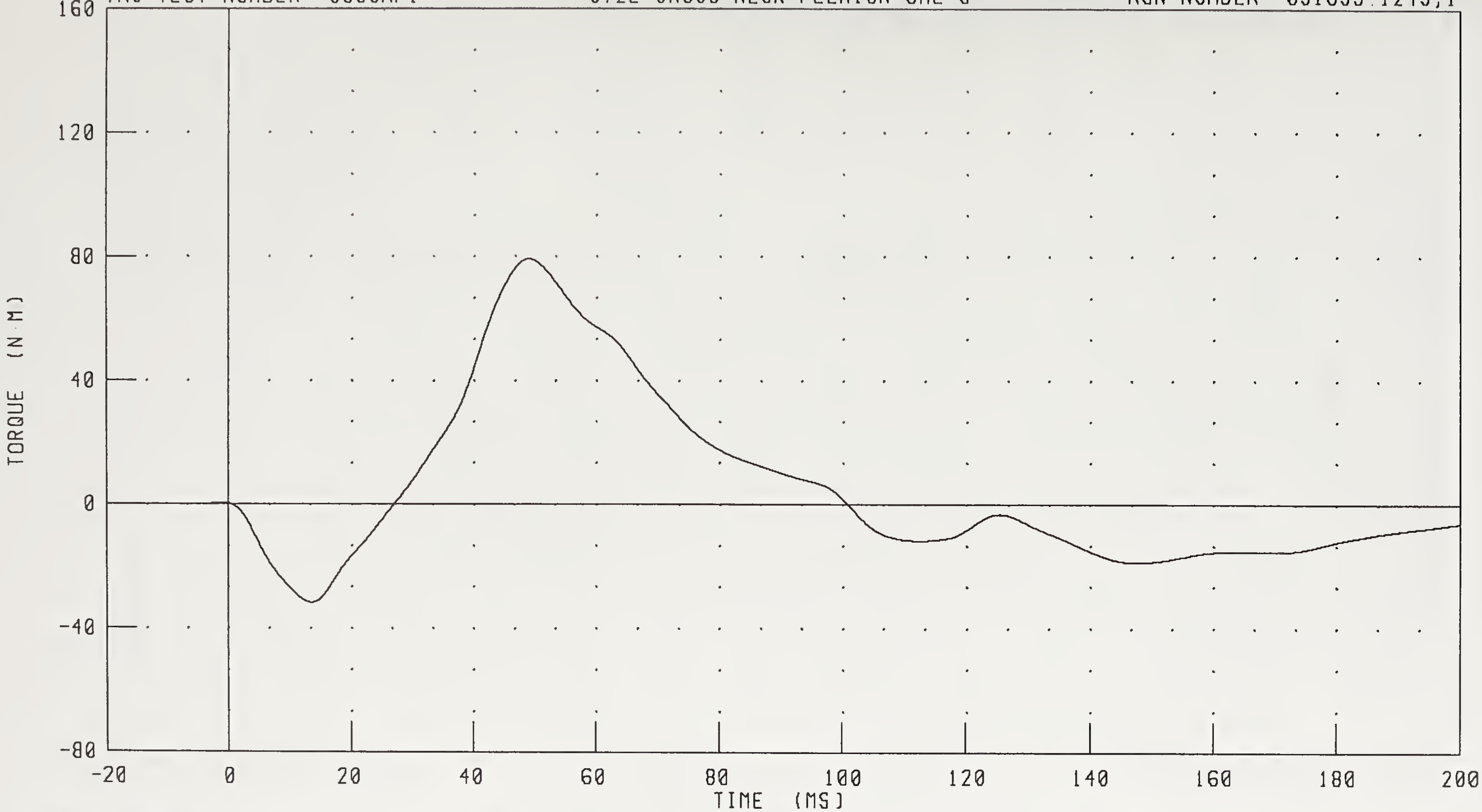
TRC TEST NUMBER: 83C3NF1 572E SN083 NECK FLEXION CAL-3 RUN NUMBER: 051895.1243;1



CHANNEL: NEKXF FILTER: CH. CLASS 60 PEAK DATA: 830.02 N @ 56.00 MS; -183.93 N @ 162.16 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK MOMENT Y AXIS

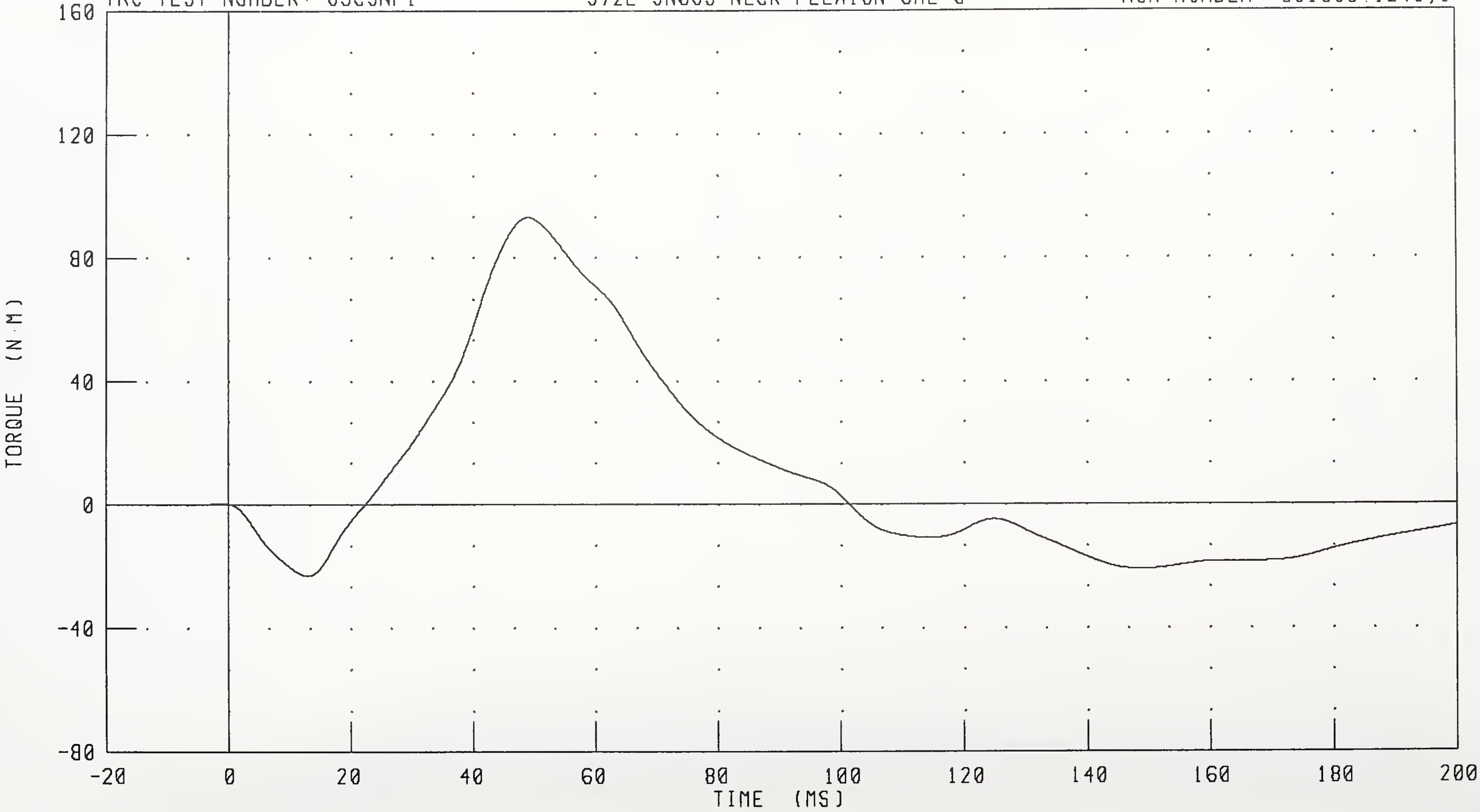
TRC TEST NUMBER: 83C3NF1 572E SN083 NECK FLEXION CAL-3 RUN NUMBER: 051895.1243;1



CHANNEL: NEKYM FILTER: CH. CLASS 60 PEAK DATA: 79.32 N·M @ 48.96 MS, -31.67 N·M @ 13.52 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 83C3NF1 572E SN083 NECK FLEXION CAL-3 RUN NUMBER: 051895.1243;1



CHANNEL: NEKOM FILTER: CH. CLASS 60 PEAK DATA: 93.13 N·M @ 48.96 MS; -23.05 N·M @ 12.96 MS

TRANSPORTATION RESEARCH CENTER INC.

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

HYBRID III 18-MAY-95

TRC INC. TEST NO: 83C3NE1 572E SN083 NECK EXT. CAL03

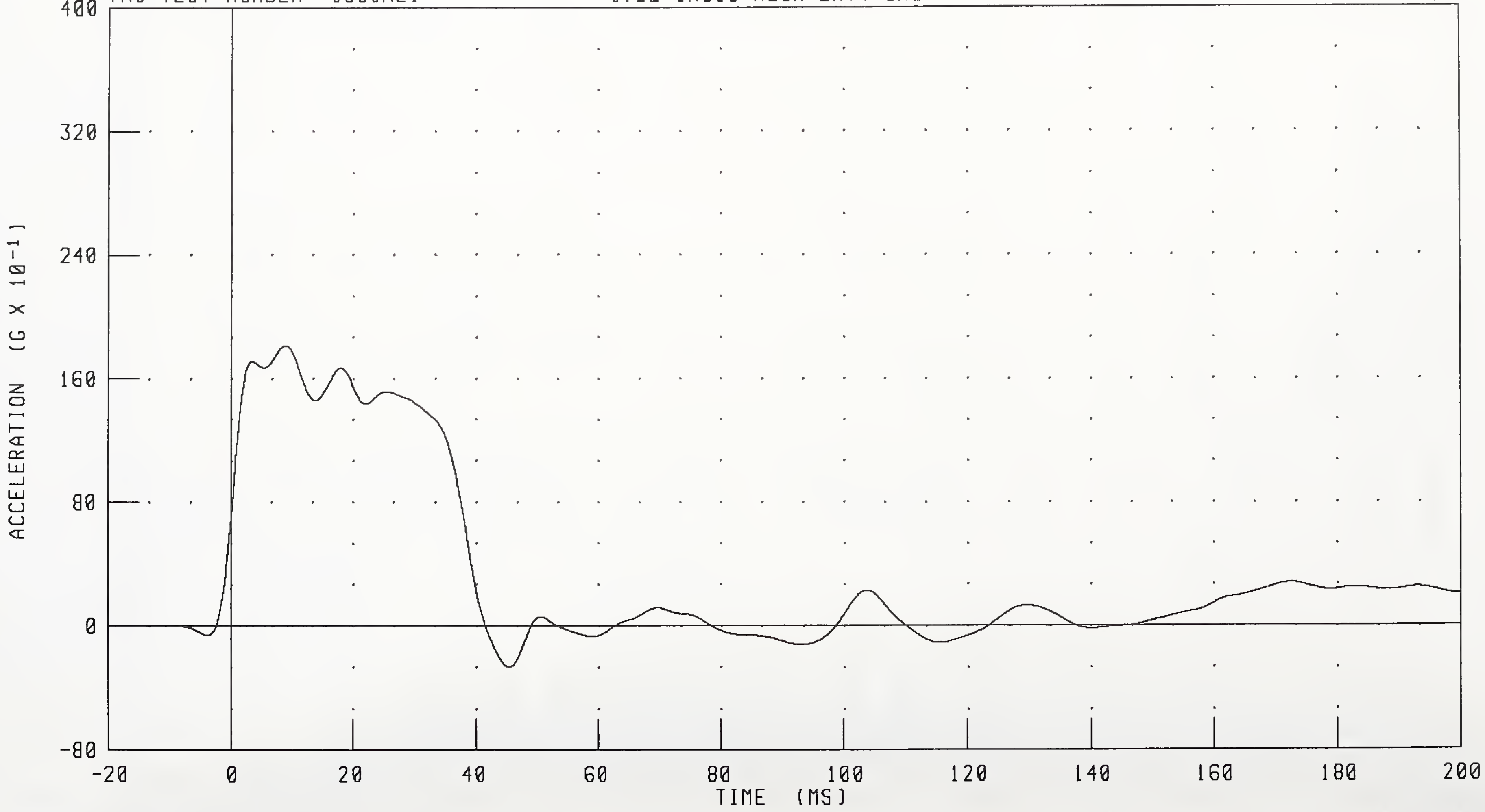
TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	50.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.00 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	17.71 G
	20 MS	14.00 - 19.00 G	15.47 G
	30 MS	11.00 - 16.00 G	14.43 G
MAX PENDULUM G		22 G MAX	18.13 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	14.41 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	38.72 MS
D PLANE ROTATION	MAX	81 - 106 DEG.	92.96 DEG.
	TIME	72 - 82 MS	75.52 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-64.09 NM
	TIME	65 - 79 MS	69.76 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	155.68 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	136.16 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN ____________________ RUN NUMBER: 051895.1334;3

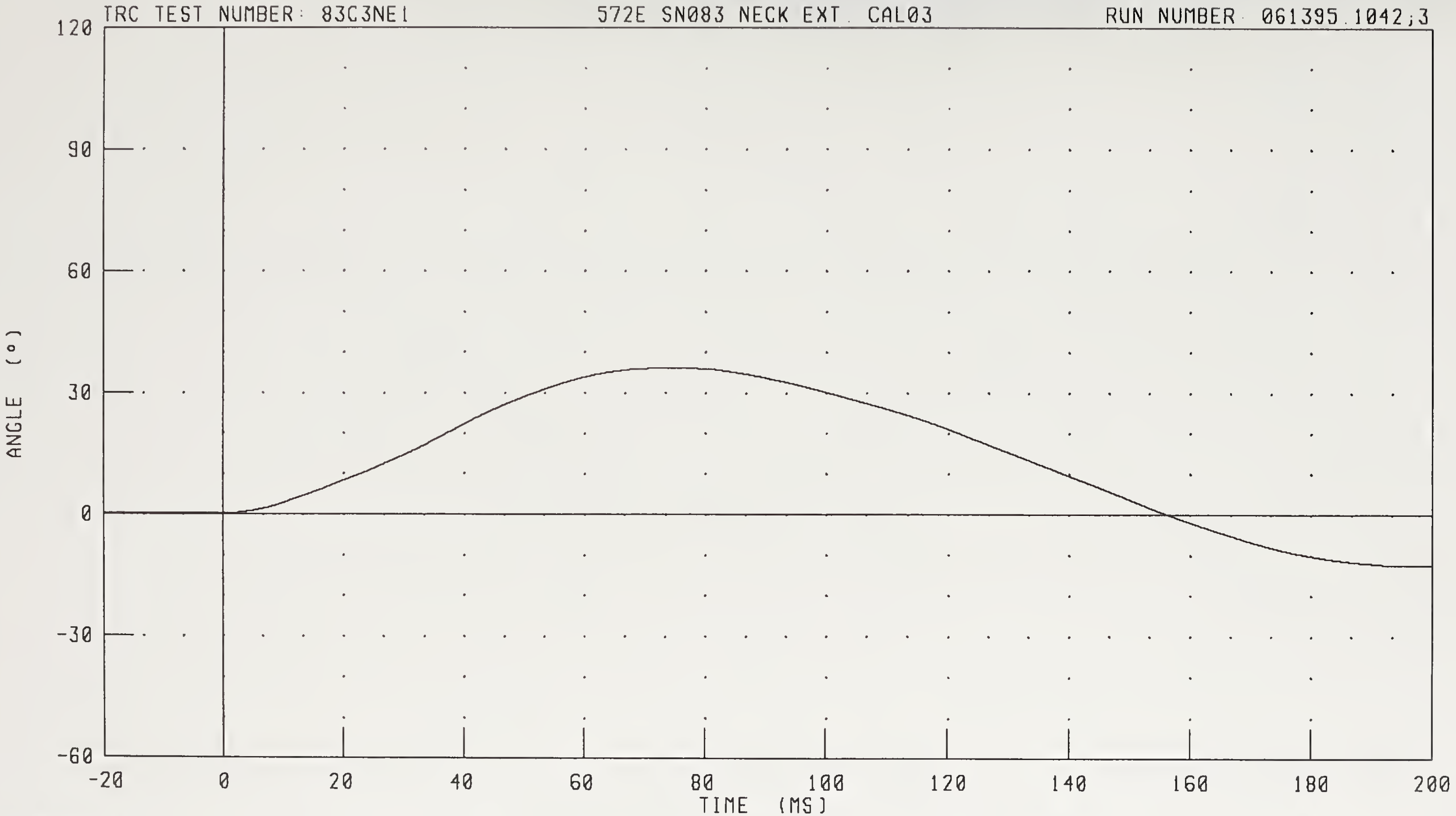
PART 572-E HYBRID III NECK EXTENSION CALIBRATION
PENDULUM DECELERATION

TRC TEST NUMBER: 83C3NE1 572E SN083 NECK EXT. CAL03 RUN NUMBER: 061395.1042;3



CHANNEL: PENXG FILTER: CH. CLASS 60 PEAK DATA: 18.13 G @ 8.88 MS; -2.66 G @ 45.36 MS

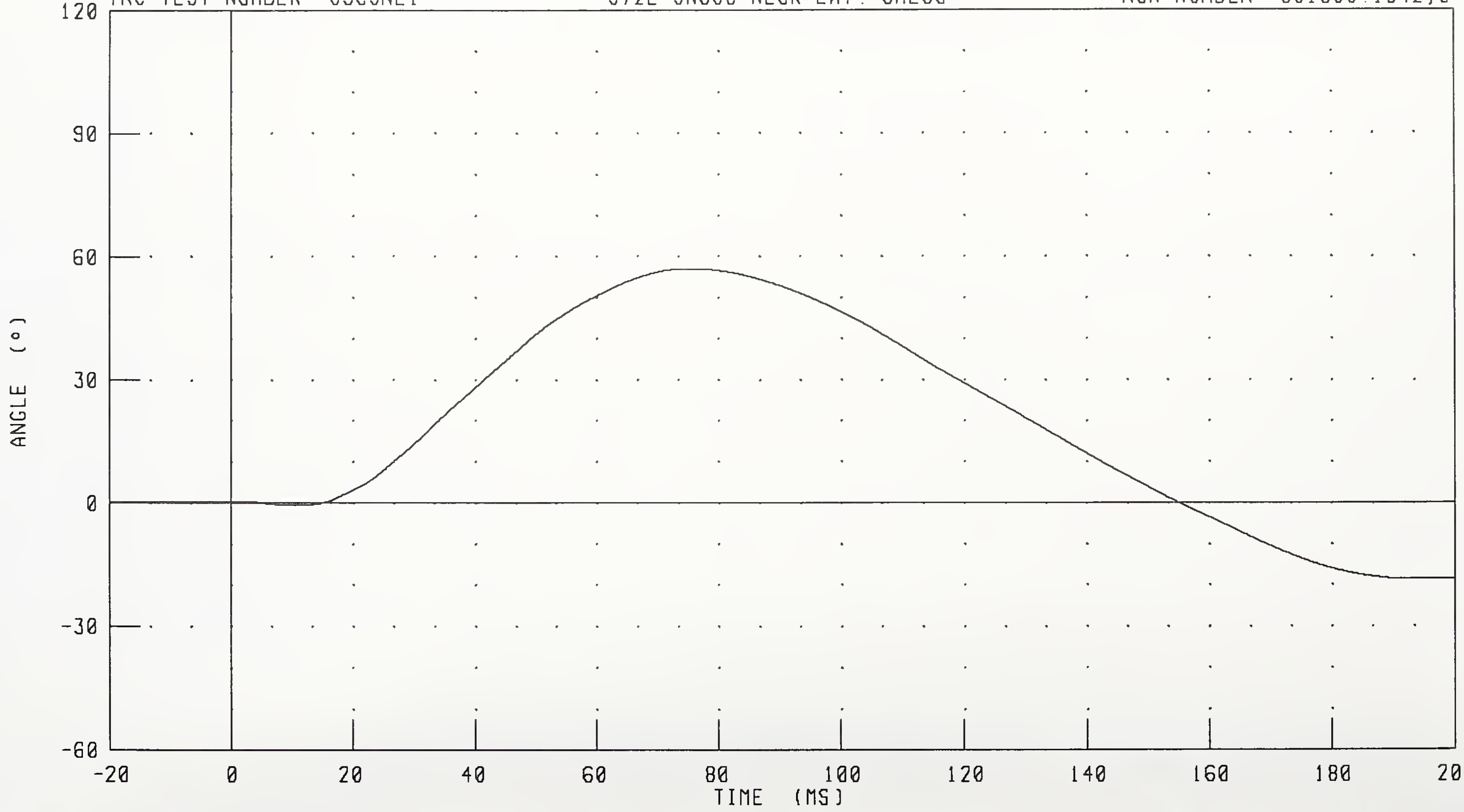
PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT BASE OF NECK



CHANNEL: BETA FILTER: CH. CLASS 60 PEAK DATA: 36.01 ° @ 77.04 MS; -12.48 ° @ 198.96 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE

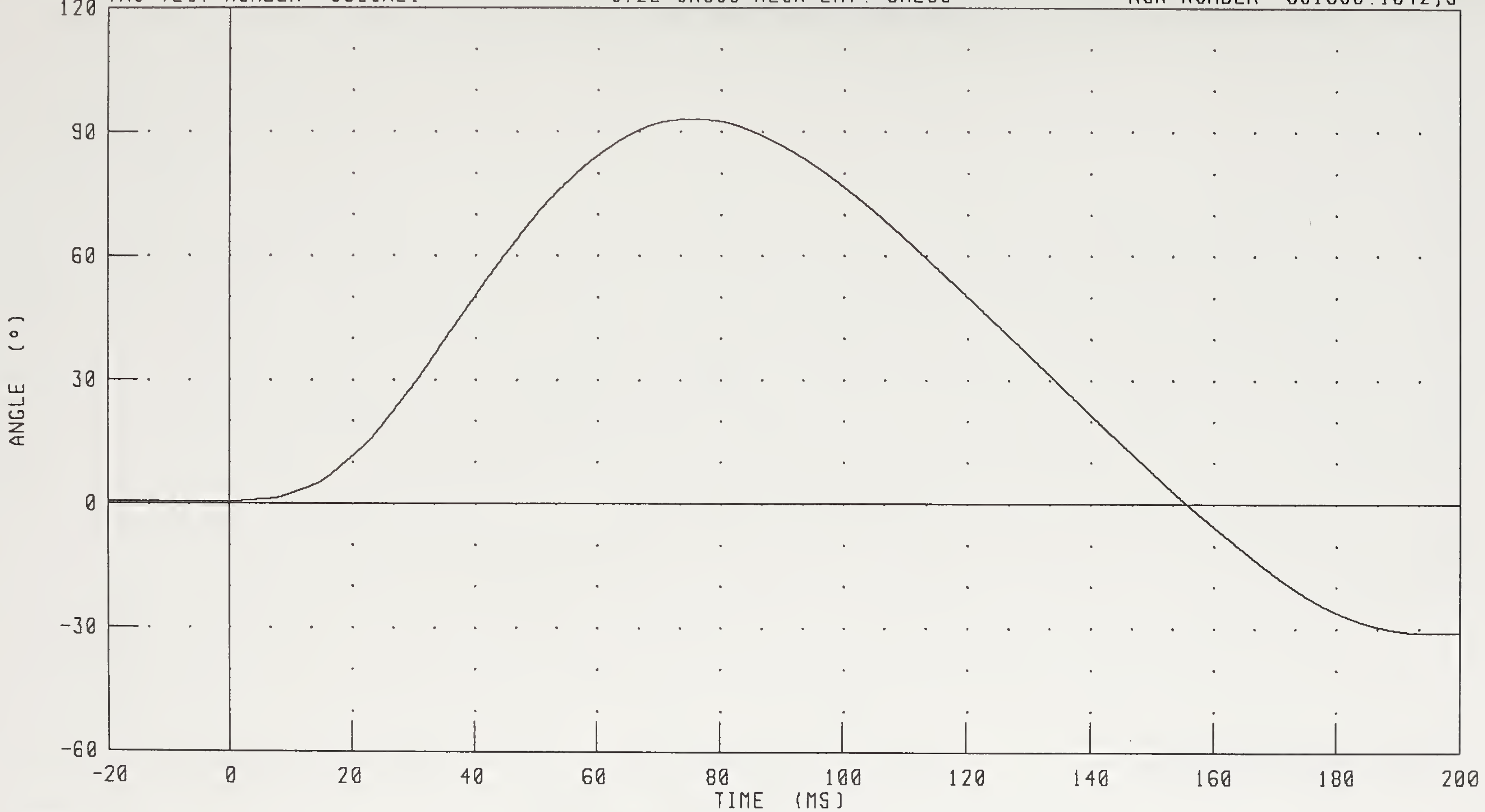
TRC TEST NUMBER: 83C3NE1
572E SN083 NECK EXT. CAL03
RUN NUMBER: 061395.1042;3



CHANNEL: THETA FILTER: CH. CLASS 60 PEAK DATA: 56.96 ° @ 75.20 MS; -18.58 ° @ 199.20 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL ROTATION

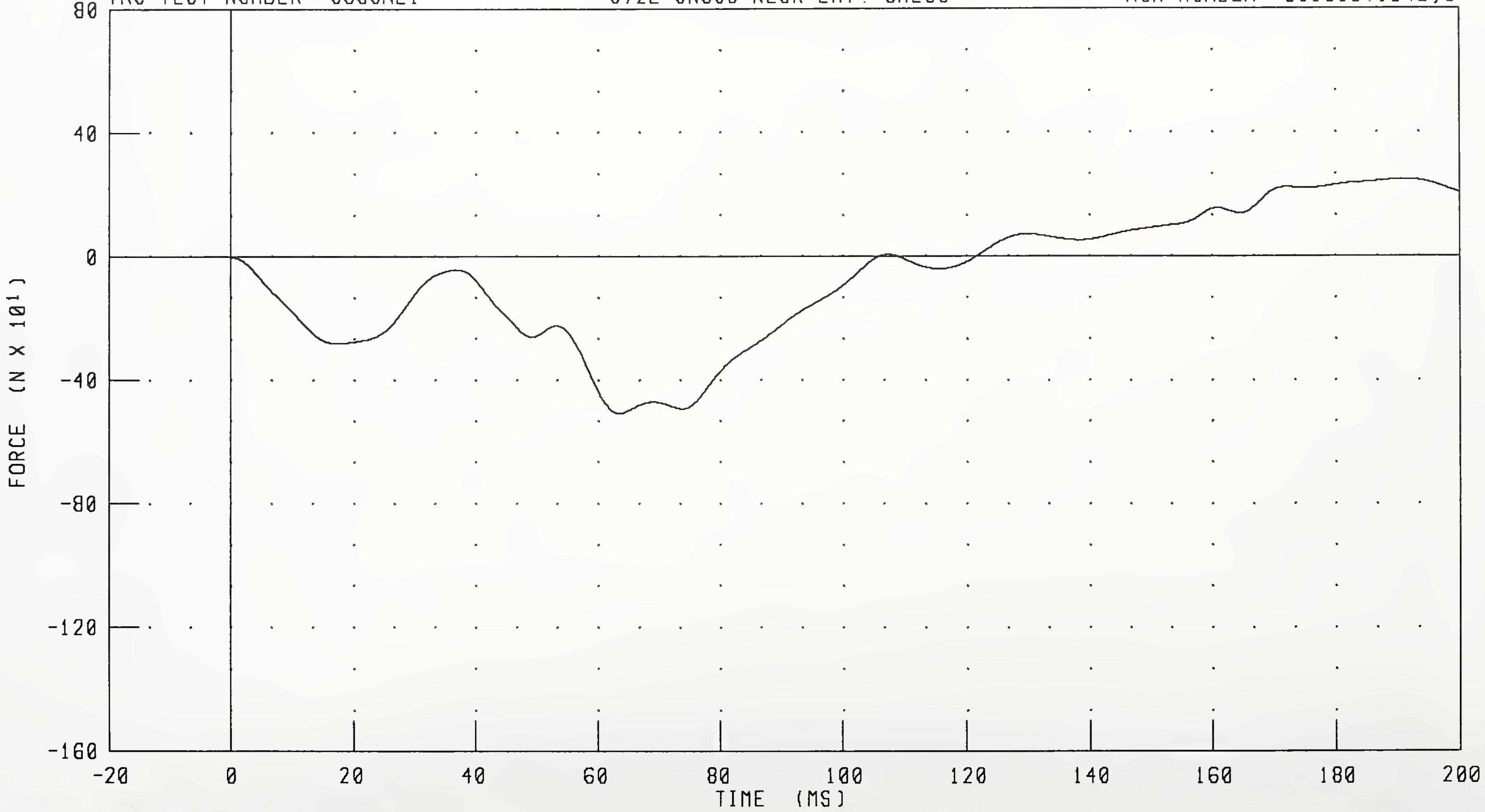
TRC TEST NUMBER: 83C3NE1 572E SN083 NECK EXT. CAL03 RUN NUMBER: 061395.1042;3



CHANNEL: TOTAN FILTER: CH. CLASS 60 PEAK DATA: 92.96 ° @ 75.52 MS; -31.05 ° @ 199.12 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
NECK FORCE X AXIS

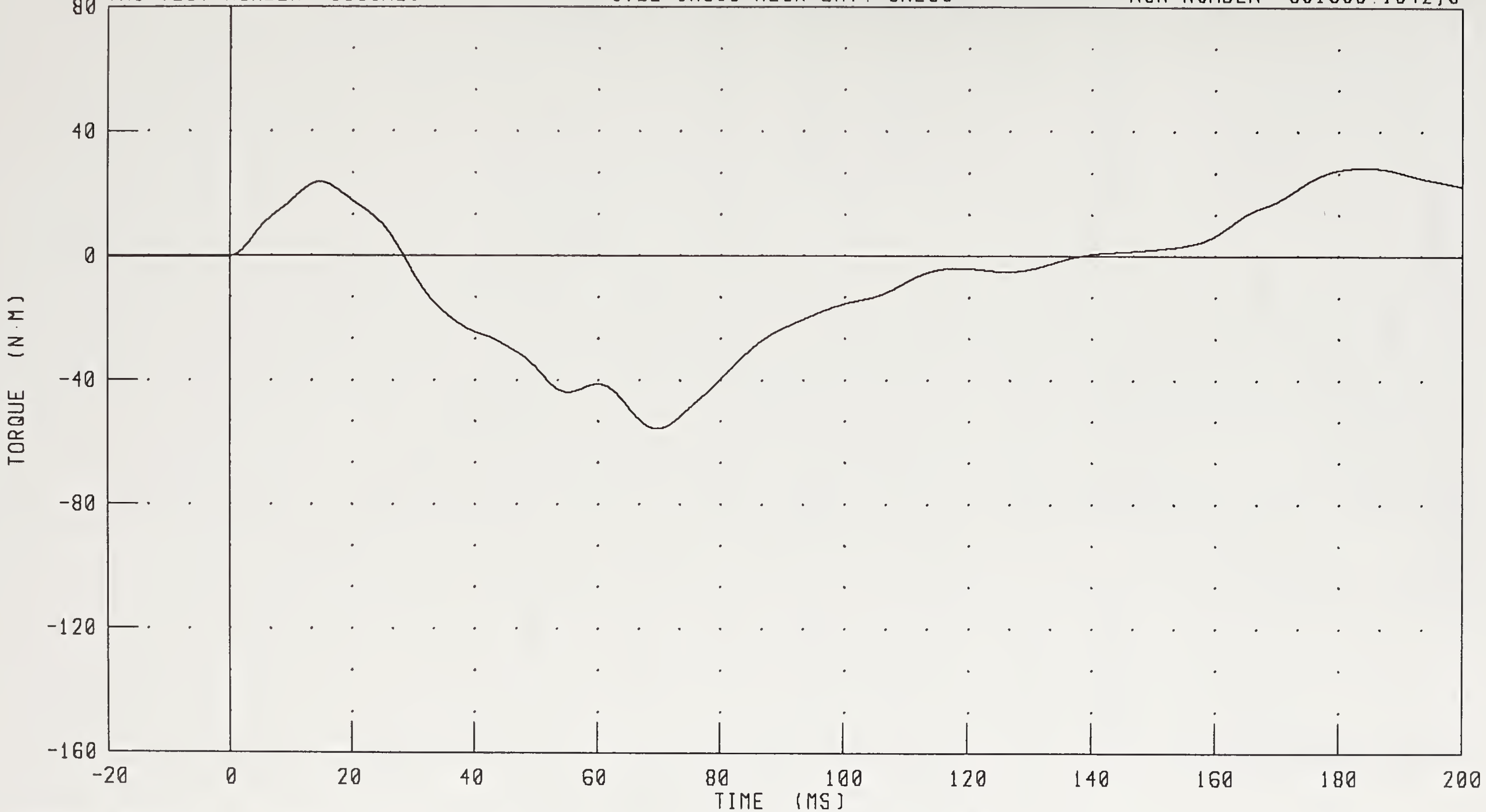
TRC TEST NUMBER: 83C3NE1 572E SN083 NECK EXT. CAL03 RUN NUMBER: 061395.1042;3



CHANNEL: NEKXF FILTER: CH. CLASS 60 PEAK DATA: 247.51 N @ 191.28 MS; -508.44 N @ 63.44 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
NECK MOMENT Y AXIS

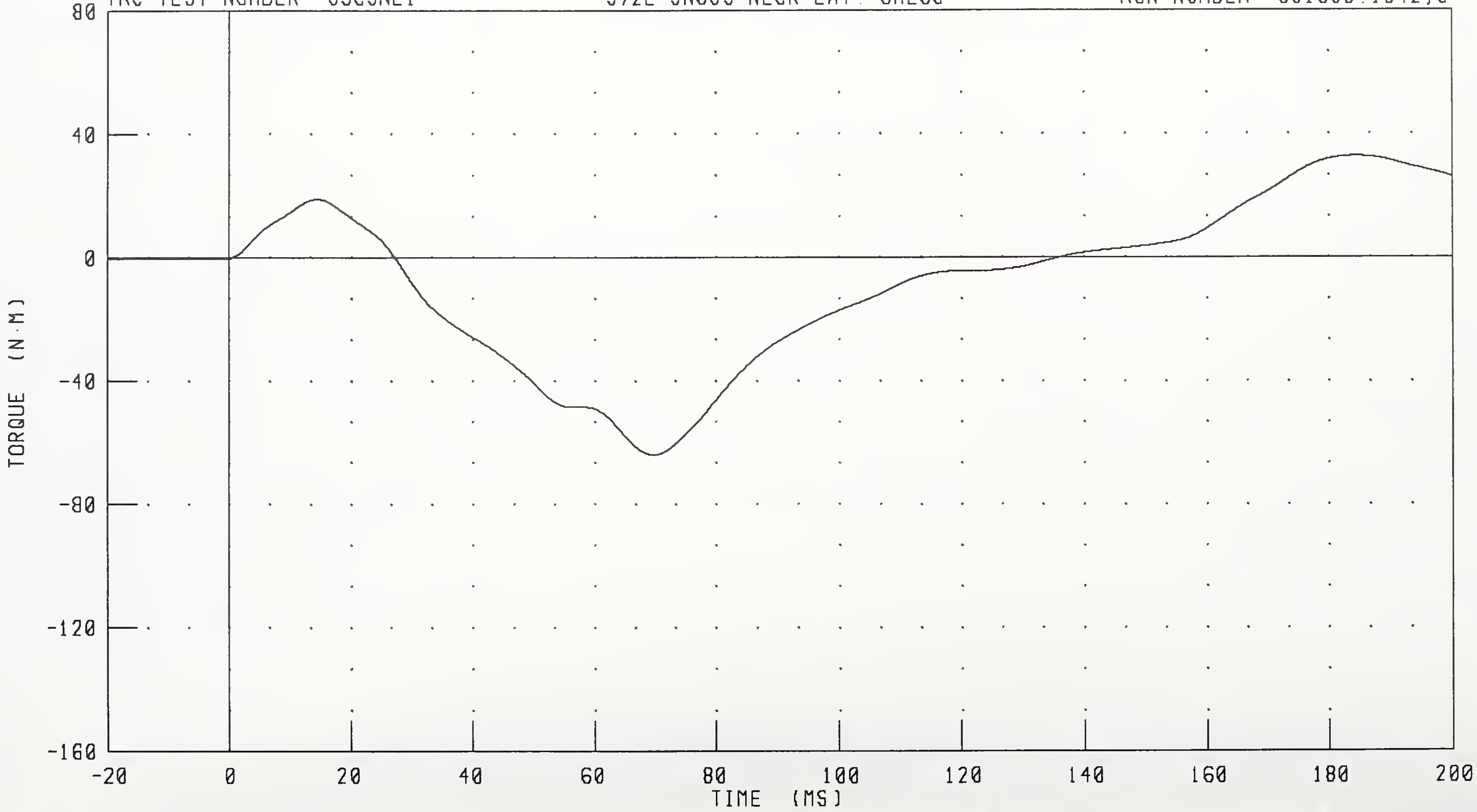
TRC TEST NUMBER: 83C3NE1 572E SN083 NECK EXT. CAL03 RUN NUMBER: 061395.1042;3



CHANNEL: NEKYM FILTER: CH. CLASS 60 PEAK DATA: 28.47 N·M @ 184 24 MS; -55.69 N·M @ 69.68 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 83C3NE1 572E SN083 NECK EXT. CAL03 RUN NUMBER: 061395.1042;3



CHANNEL: NEKOM FILTER: CH. CLASS 60 PEAK DATA: 32.71 N·M @ 184.56 MS; -64.09 N·M @ 69.76 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III 18-MAY-95

TRC INC. TEST NO: 83C3TH1 572E SN083 H.S.THORAX CAL03

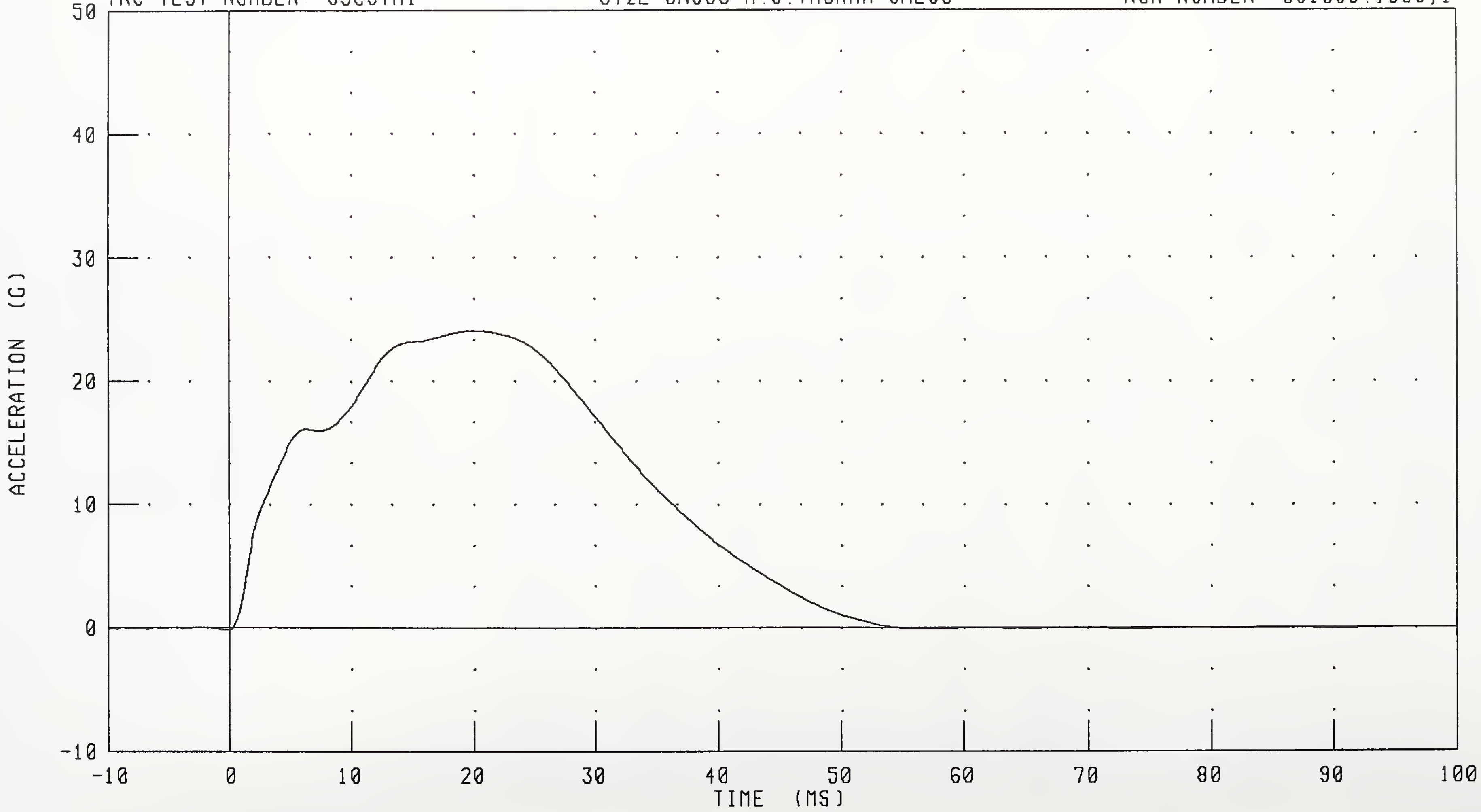
TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	50.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.68 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	66.7 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5516. N
INTERNAL HYSTERESIS	69% - 85%	72.8%

TEST MEETS SPECIFICATIONS

TECHNICIAN__________ RUN NUMBER: 051895.1505;1

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION

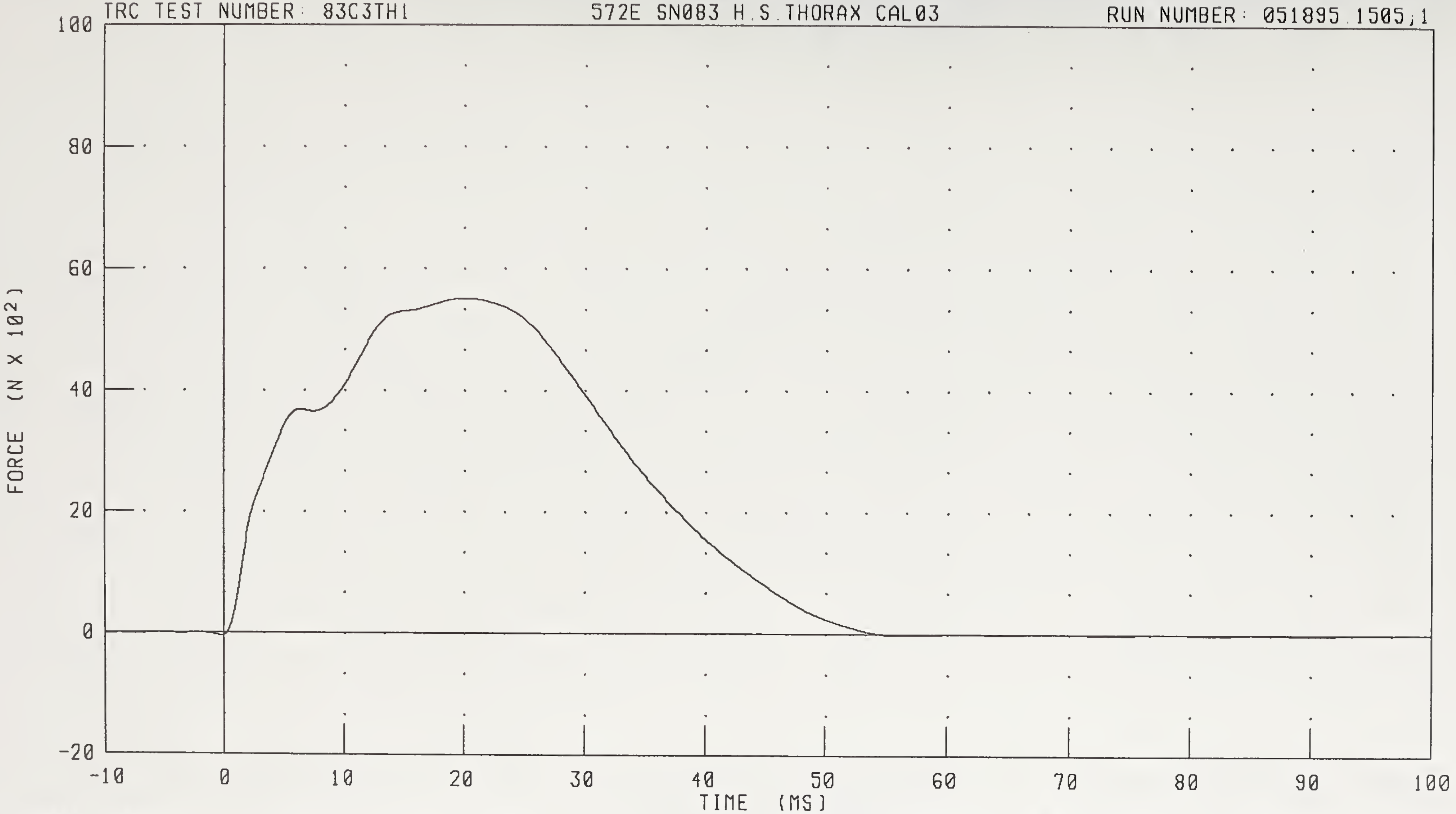
TRC TEST NUMBER: 83C3TH1 572E SN083 H.S.THORAX CAL03 RUN NUMBER: 051895.1505;1



CHANNEL: PENXG FILTER: CH. CLASS 180 PEAK DATA: 24.08 G @ 20.00 MS; -0.18 G @ -0.24 MS

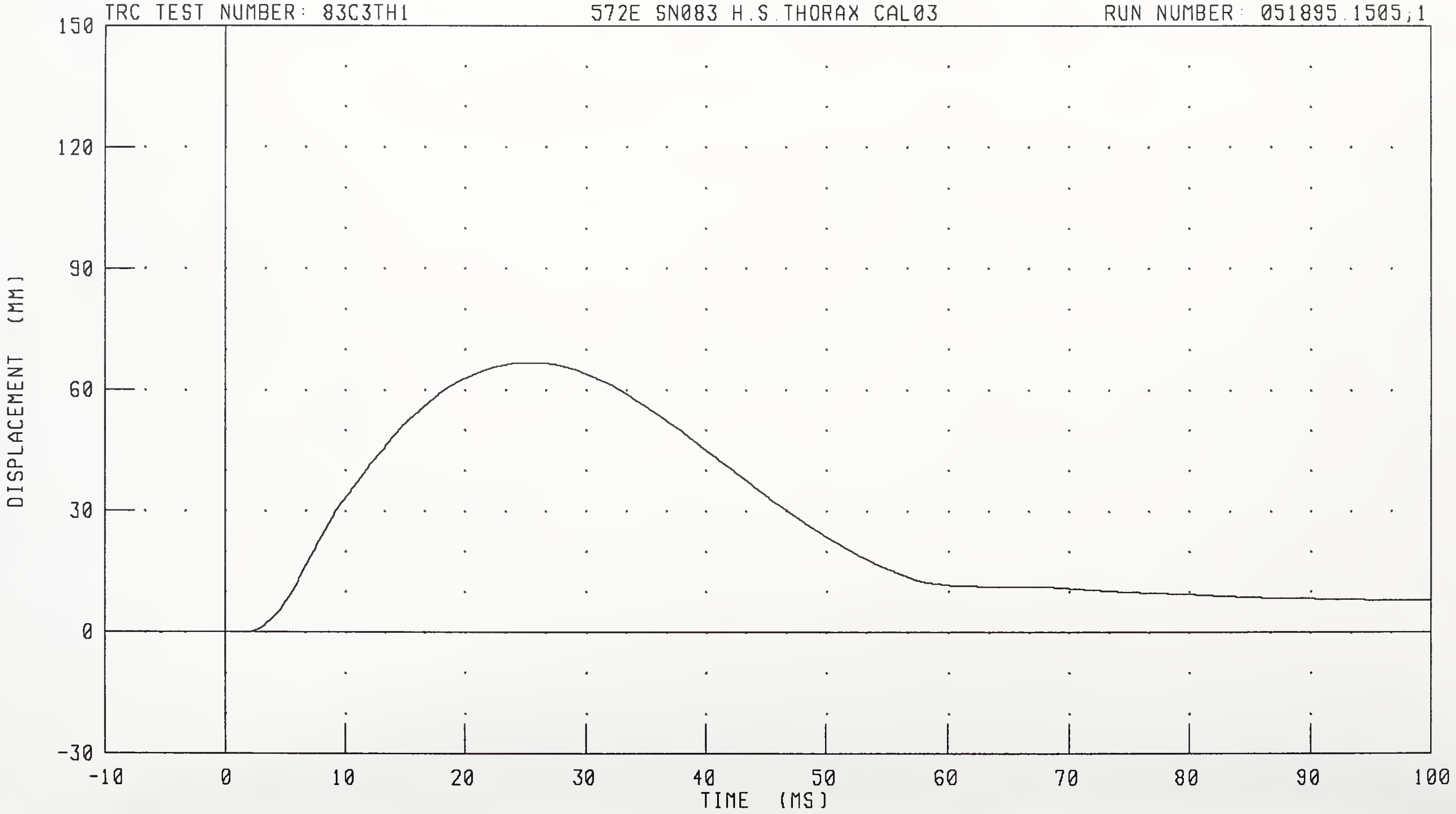
PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM FORCE

TRC TEST NUMBER: 83C3THI
572E SN083 H.S THORAX CAL03
RUN NUMBER: 051895.1505;1



CHANNEL: PENXF
FILTER: CH. CLASS 180
PEAK DATA: 5516.16 N @ 20.00 MS; -41.04 N @ -0.24 MS

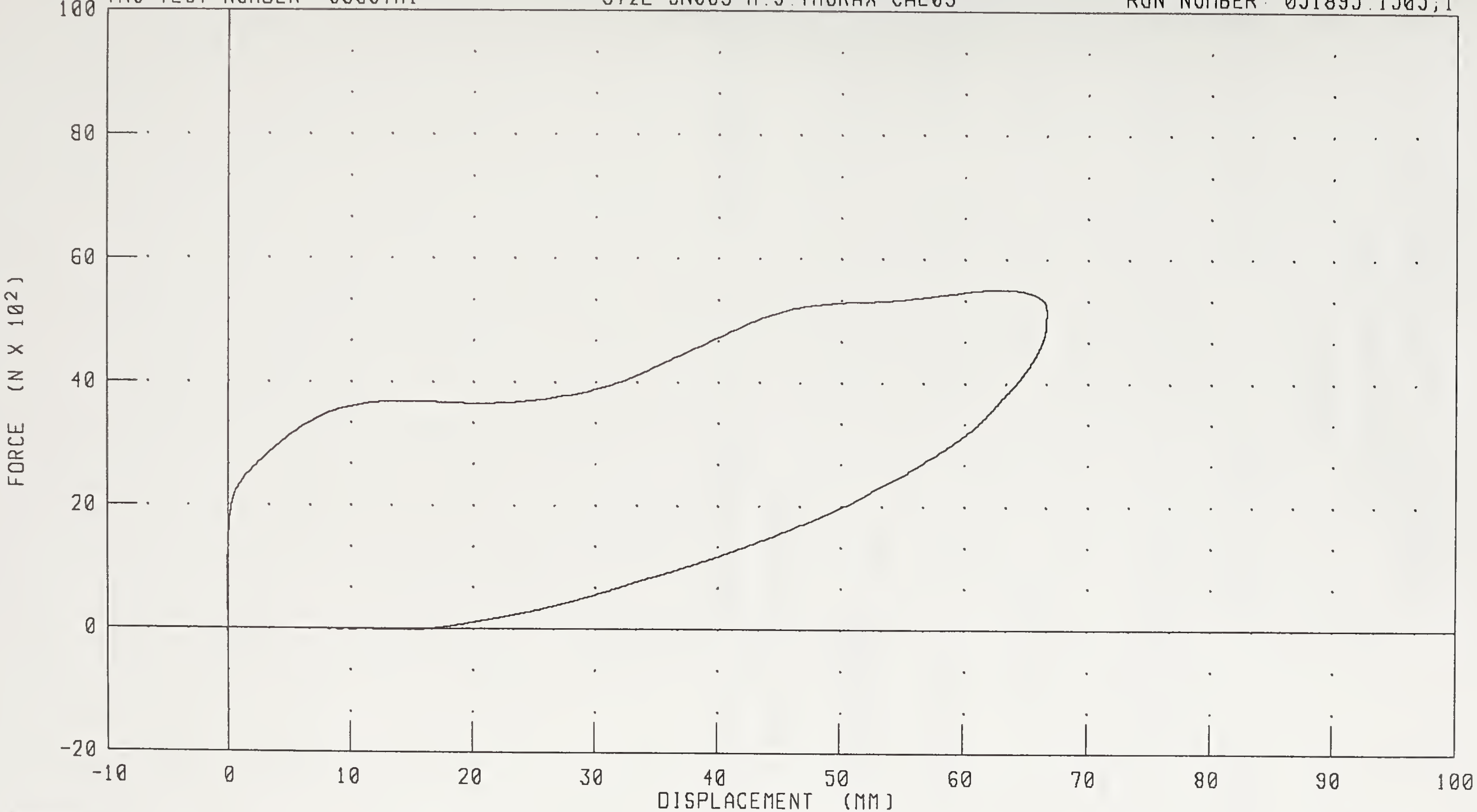
PART 572-E HYBRID III THORAX CALIBRATION
STERNUM DISPLACEMENT



CHANNEL: CSTXD FILTER: CH. CLASS 180 PEAK DATA: 66.70 MM @ 25.12 MS; -0.06 MM @ -5.36 MS

PART 572-E HYBRID III THORAX CALIBRATION
CHEST DISPLACEMENT VS PENDULUM FORCE

TRC TEST NUMBER: 83C3TH1
572E SN083 H.S. THORAX CAL03
RUN NUMBER: 051895.1505;1



CHANNEL: CSTXD FILTER: CH. CLASS 180
PENXF CH. CLASS 180

PEAK DATA: 66.70 MM @ 25.12 MS; -0.06 MM @ -5.36 MS
5516.16 N @ 20.00 MS; -41.04 N @ -0.24 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III 18-MAY-95

TRC INC. TEST NO: 83C3RK1 572E SN083 RIGHT KNEE CAL 03

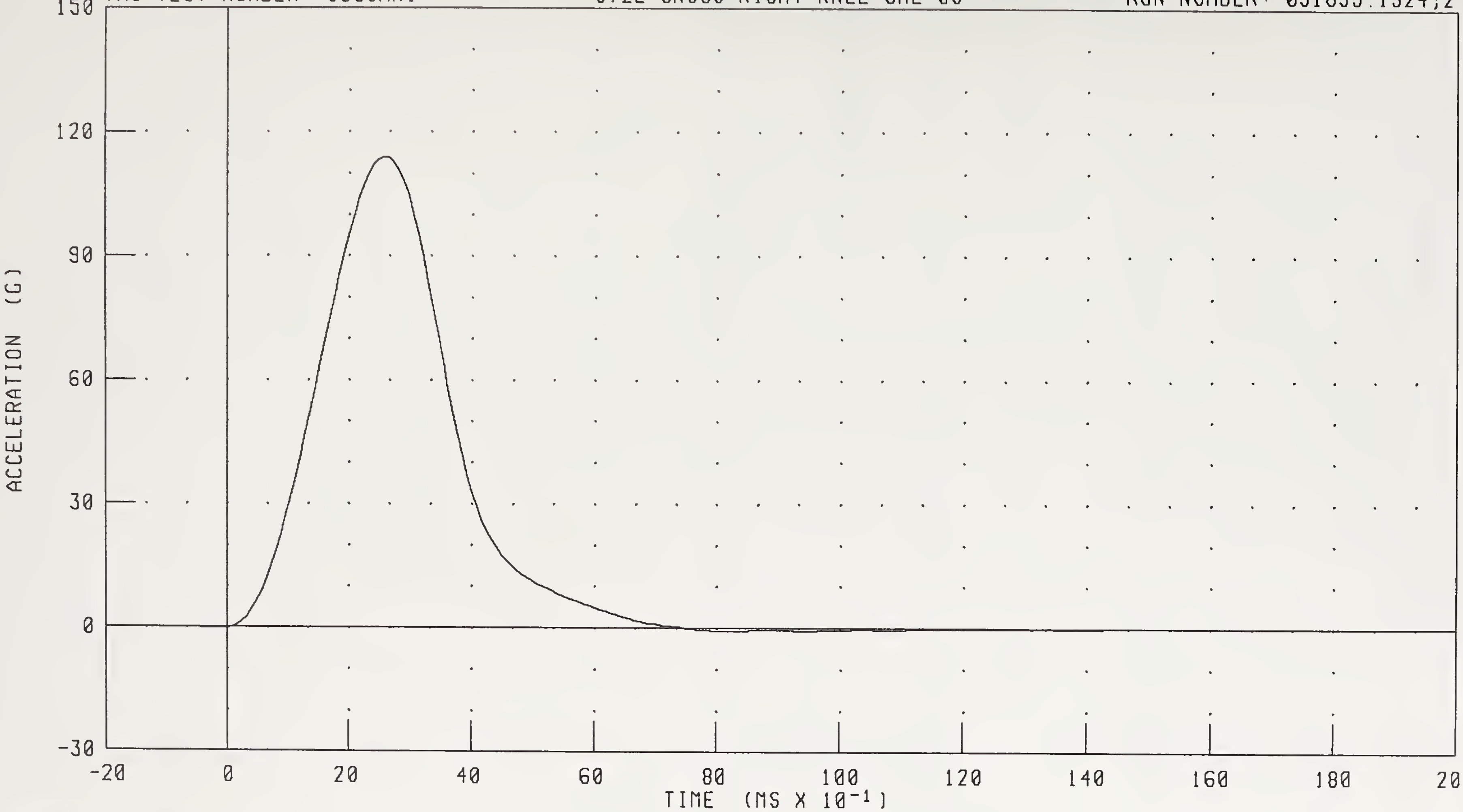
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	50.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5576.6 N

TEST MEETS SPECIFICATIONS

TECHNICIAN Pete Fout RUN NUMBER: 051895.1250;2

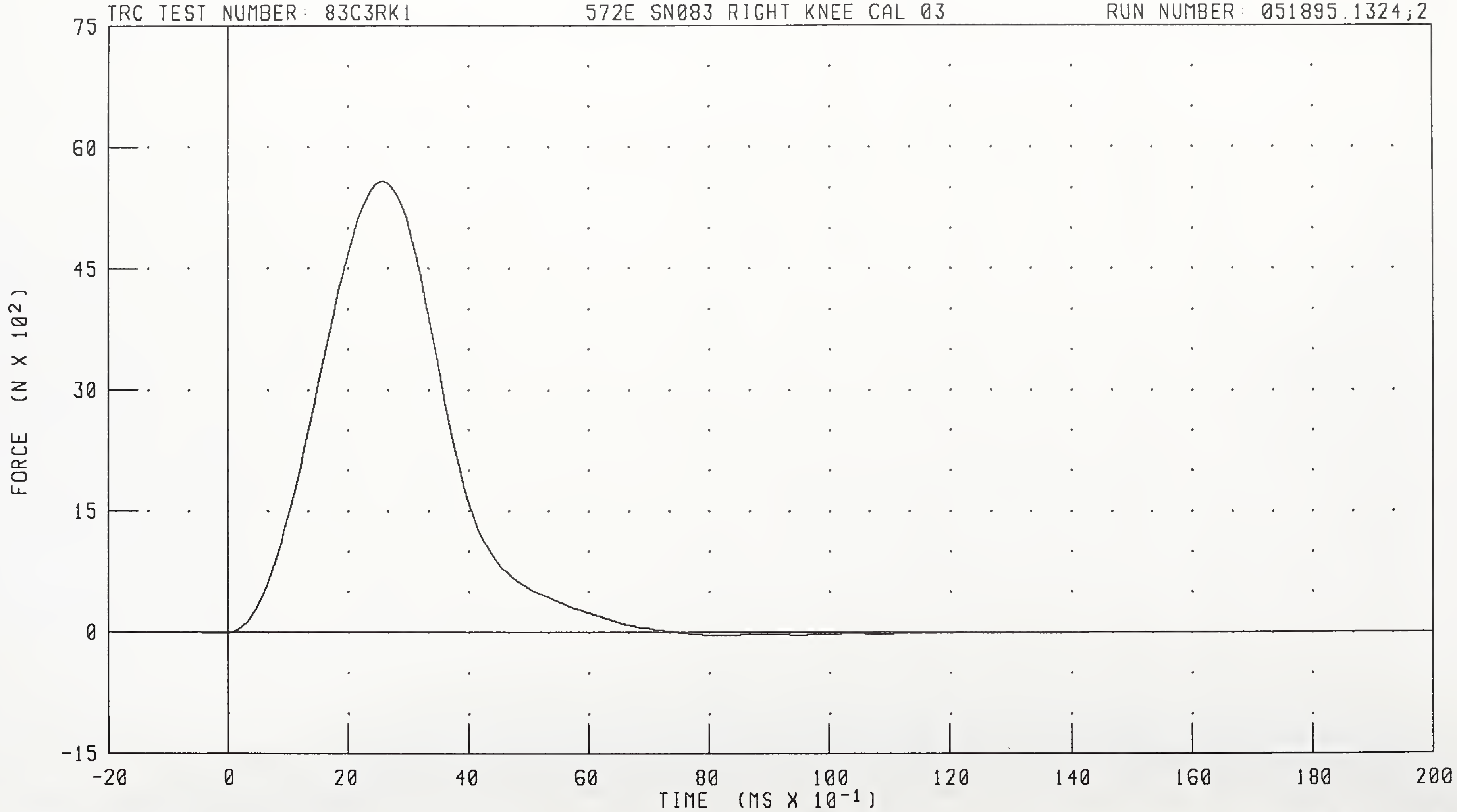
PART 572-E HYBRID III RIGHT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)

TRC TEST NUMBER: 83C3RK1 572E SN083 RIGHT KNEE CAL 03 RUN NUMBER: 051895.1324;2



CHANNEL: PENXG FILTER: CH. CLASS 600 PEAK DATA: 113.98 G @ 2.56 MS; -0.75 G @ 8.16 MS

PART 572-E HYBRID III RIGHT KNEE CALIBRATION
PENDULUM FORCE (5 KG PEND.)



CHANNEL: PENXF FILTER: CH. CLASS 600 PEAK DATA: 5576.61 N @ 2.56 MS; -36.71 N @ 8.16 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III 18-MAY-95

TRC INC. TEST NO: 83C3LK1 572E SN083 LEFT KNEE CAL 03

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	50.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5494.4 N

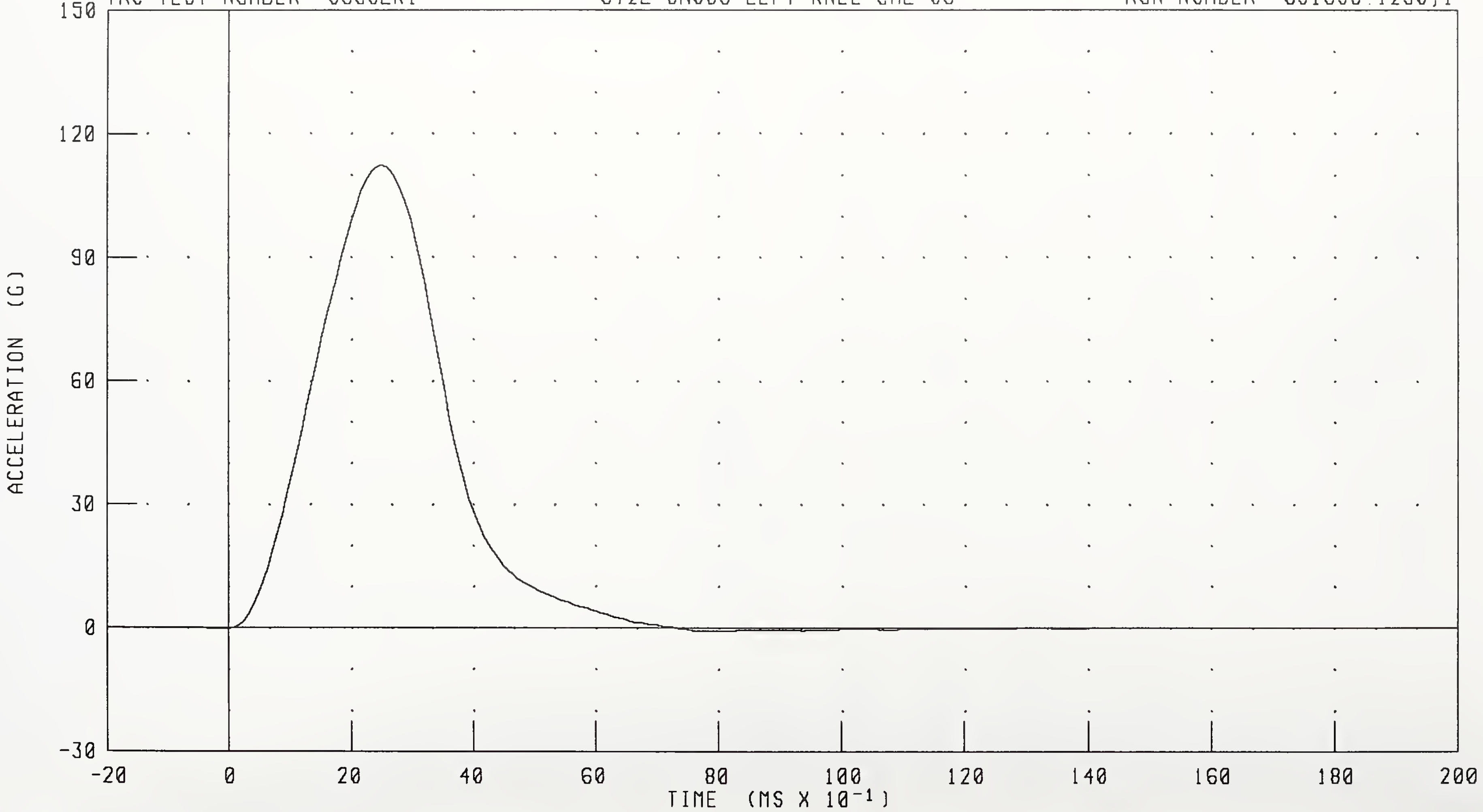
TEST MEETS SPECIFICATIONS

TECHNICIAN

RUN NUMBER: 051895.1229;1

PART 572-E HYBRID III LEFT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)

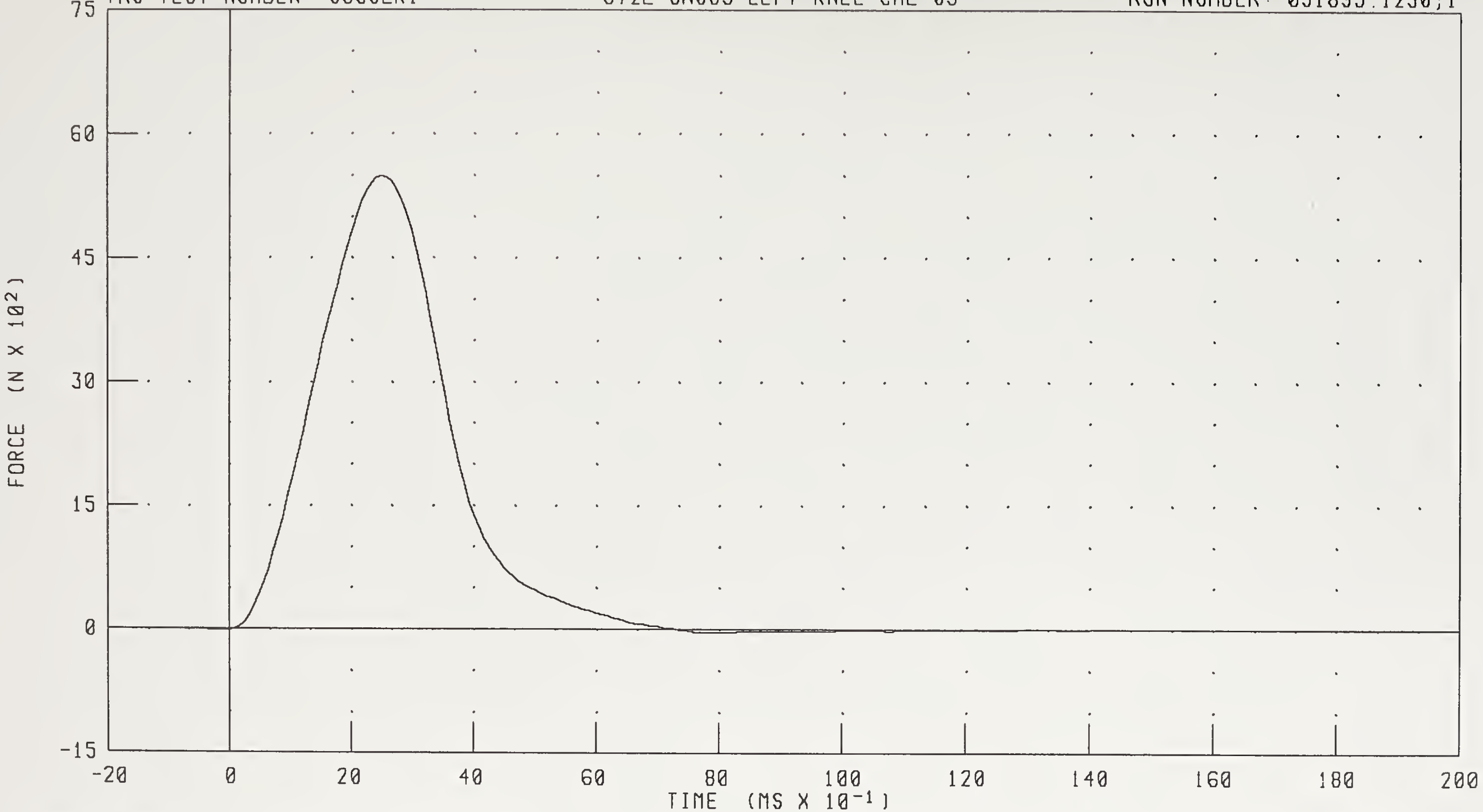
TRC TEST NUMBER: 83C3LK1
572E SN083 LEFT KNEE CAL 03
RUN NUMBER: 051895.1230;1



CHANNEL: PENXG FILTER: CH. CLASS 600 PEAK DATA: 112.30 G @ 2.48 MS; -0.79 G @ 7.92 MS

PART 572-E HYBRID III LEFT KNEE CALIBRATION
PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 83C3LK1
572E SN083 LEFT KNEE CAL 03
RUN NUMBER: 051895.1230;1



CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 5494.44 N @ 2.48 MS; -38.80 N @ 7.92 MS

Pre-test Certification Data

Passenger Dummy S/N: 177

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III EXTERNAL DIMENSIONS
177 ALDERSON 18-MAY-95
TRC INC. TEST NO: 177C64ED1 572E SN177 EXT.DIMENSION CAL64

TEST PARAMETER	(DIMEN.)	SPECIFICATION	TEST RESULTS
LOCATION FOR CHEST CIRCUMFERENCE	(AA)	429 - 434 MM	432. MM
LOCATION FOR WAIST CIRCUMFERENCE	(BB)	226 - 231 MM	229. MM
CHEST CIRCUMFERENCE	(Y)	970 -1001 MM	983. MM
WAIST CIRCUMFERENCE	(Z)	836 - 866 MM	846. MM
CHEST DEPTH	(O)	213 - 229 MM	216. MM
H-POINT HEIGHT	(C)	84 - 89 MM	86. MM
H-POINT FROM SEATBACK	(D)	135 - 140 MM	137. MM
SKULL CAP TO BACKLINE	(H)	41 - 46 MM	43. MM
TOTAL SITTING HEIGHT	(A)	879 - 889 MM	884. MM
THIGH CLEARANCE	(F)	140 - 155 MM	145. MM
BUTTOCK KNEE LENGTH	(K)	579 - 605 MM	602. MM
BUTTOCK POPLITEAL LENGTH	(N)	452 - 478 MM	475. MM
POPLITEAL HEIGHT	(L)	429 - 455 MM	450. MM
KNEE PIVOT HEIGHT	(M)	485 - 500 MM	493. MM
FOOT LENGTH	(P)	252 - 267 MM	262. MM
FOOT BREADTH	(W)	91 - 107 MM	102. MM
SHOULDER PIVOT FROM BACKLINE	(E)	84 - 94 MM	91. MM
SHOULDER BREADTH	(V)	422 - 437 MM	429. MM
SHOULDER PIVOT HEIGHT	(B)	506 - 521 MM	511. MM
ELBOW REST HEIGHT	(J)	191 - 211 MM	208. MM
SHOULDER-ELBOW LENGTH	(I)	330 - 345 MM	338. MM
BACK OF ELBOW TO WRIST PIVOT	(G)	290 - 305 MM	295. MM

DUMMY MEETS SPECIFICATIONS
TECHNICIAN ____________ RUN NUMBER: 051995.0823

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III 18-MAY-95

TRC INC. TEST NO: 177C64HD1 572E SN177 HEAD DROP CAL 64

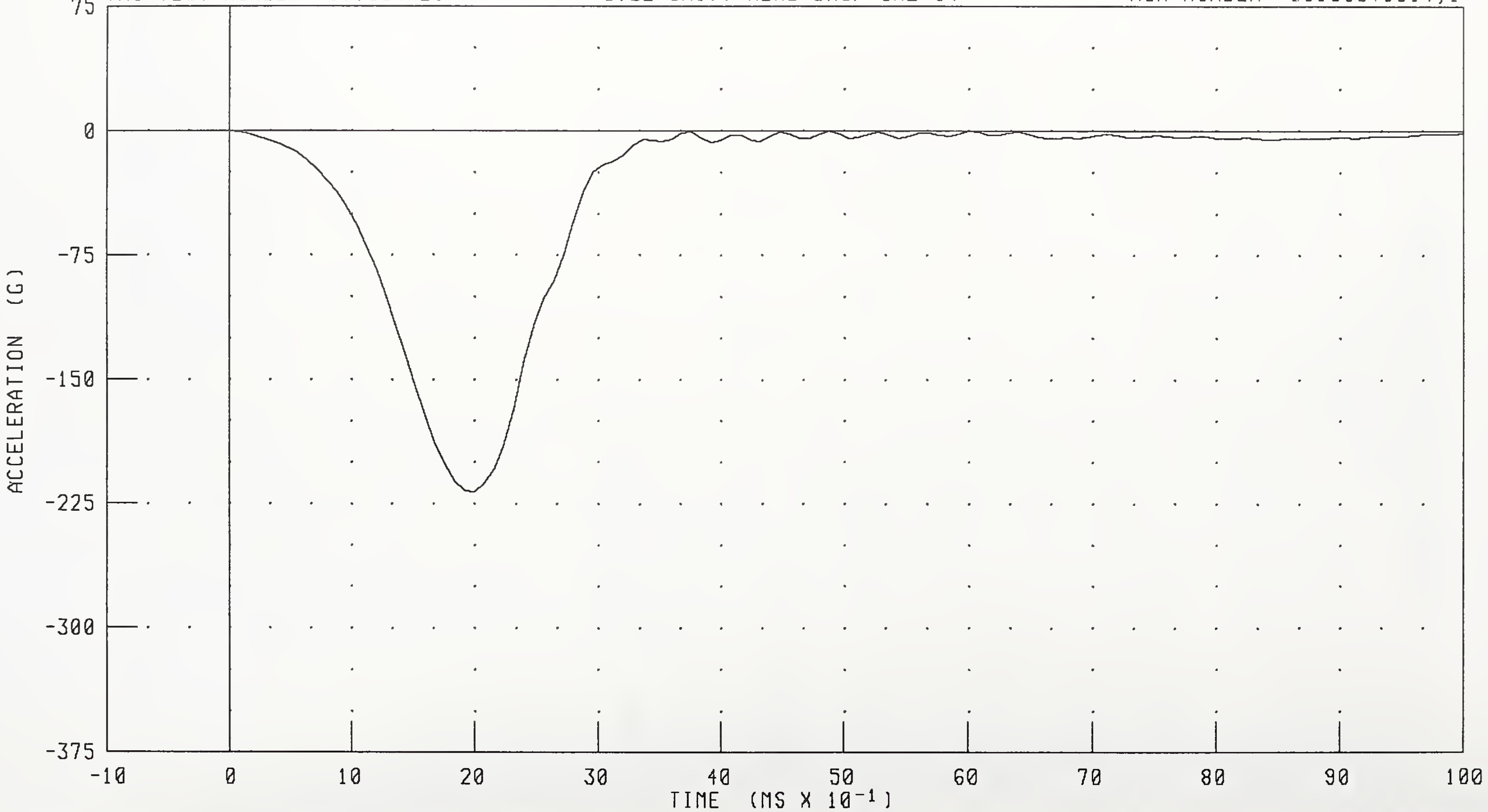
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	50.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	254.25 G
PEAK LATERAL ACCELERATION	15 G MAX	-3.67 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN____________________ RUN NUMBER: 051895.0914;1

PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION X AXIS

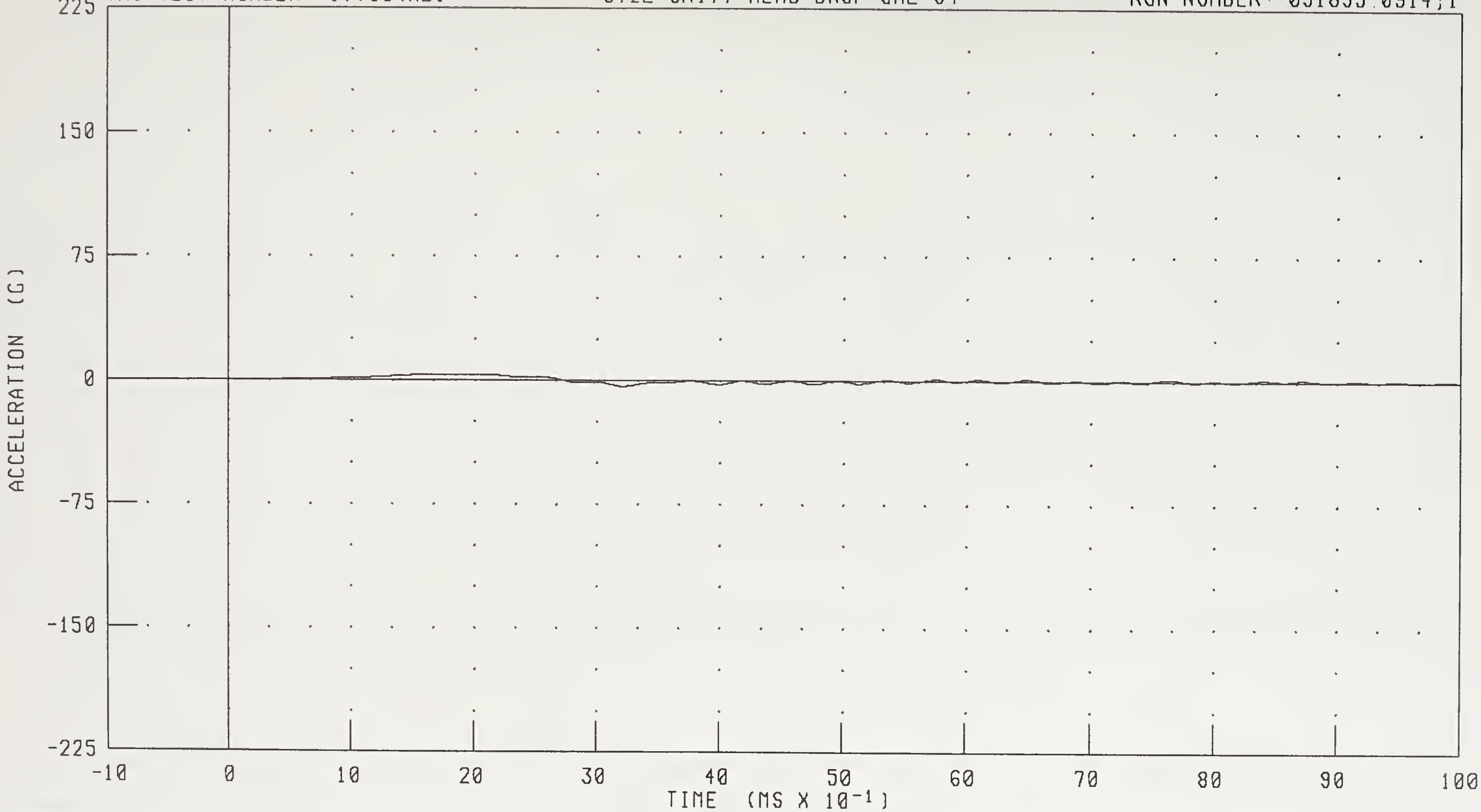
TRC TEST NUMBER: 177C64HD1
572E SN177 HEAD DROP CAL 64
RUN NUMBER: 051895.0914;1



CHANNEL: HEDXG FILTER: CH. CLASS 1000 PEAK DATA: -0.22 G @ 0.00 MS; -217.87 G @ 2.00 MS

PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Y AXIS

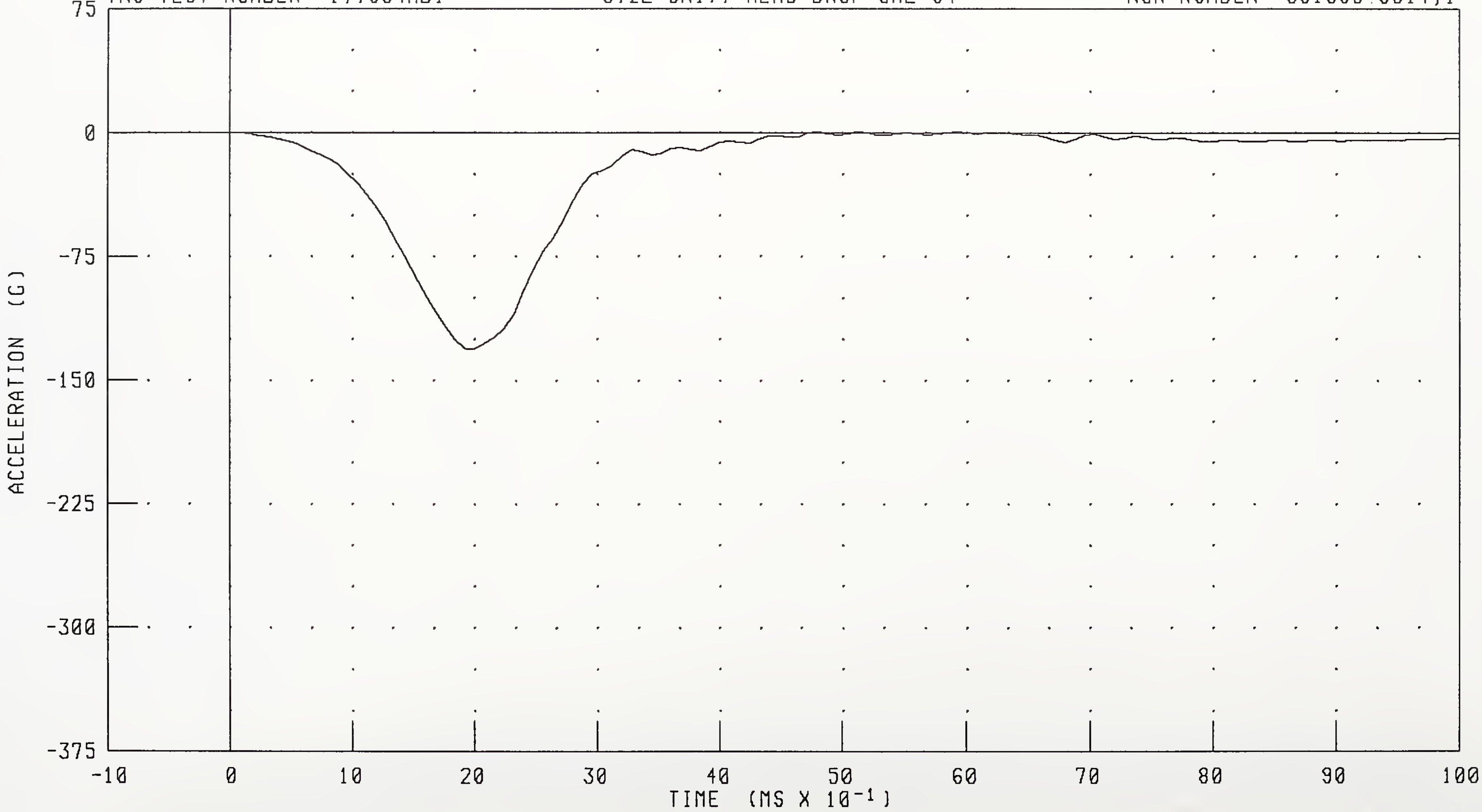
TRC TEST NUMBER 177C64HD1 572E SN177 HEAD DROP CAL 64 RUN NUMBER: 051895.0914;1



CHANNEL: HEDYG FILTER: CH. CLASS 1000 PEAK DATA: 3.44 G @ 1.76 MS; -3.68 G @ 3.20 MS

PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Z AXIS

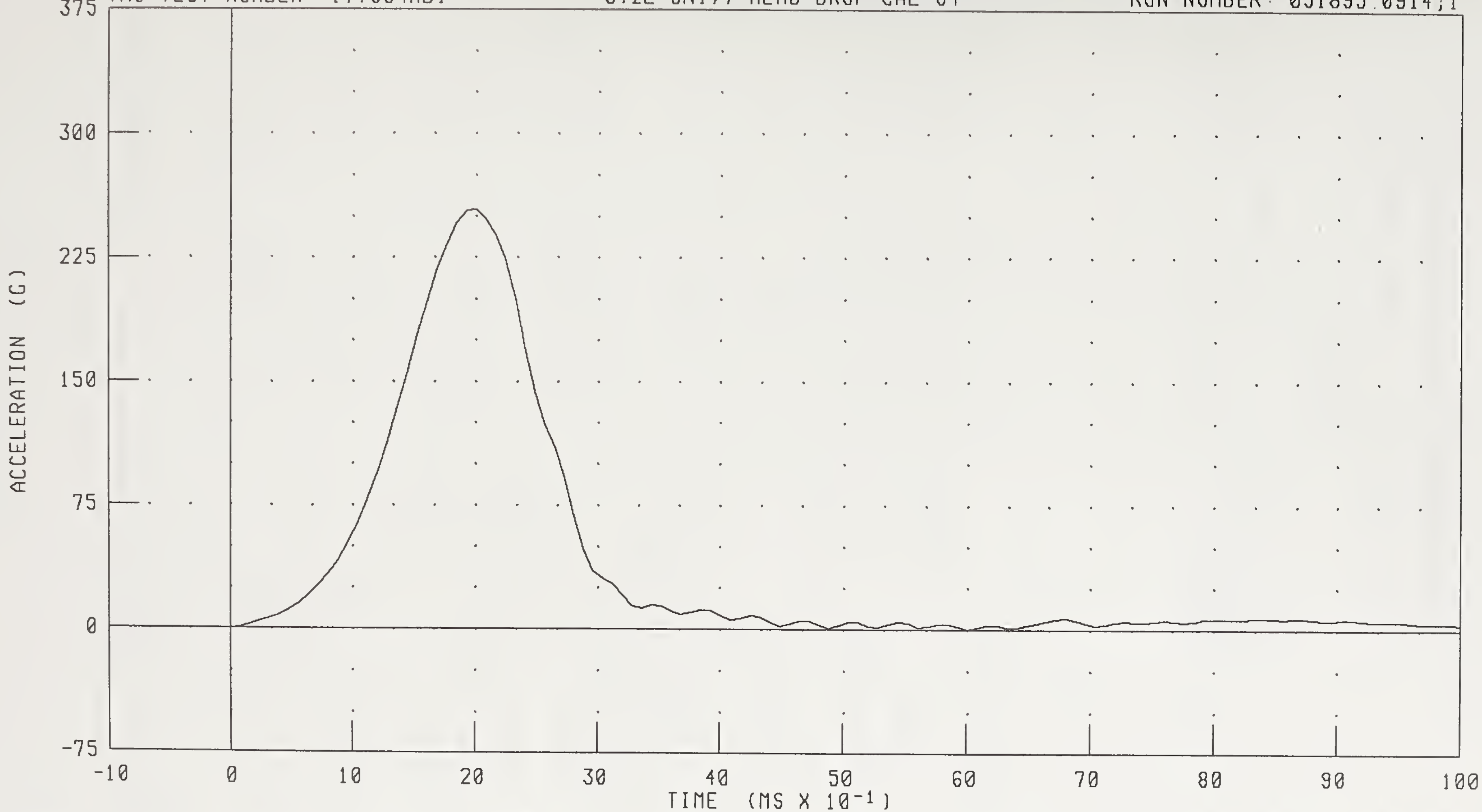
TRC TEST NUMBER: 177C64HD1　572E SN177 HEAD DROP CAL 64　RUN NUMBER: 051895.0914;1



CHANNEL: HEDZG　FILTER: CH. CLASS 1000　PEAK DATA: 0.53 G @ 4.80 MS; -131.04 G @ 2.00 MS

PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: 177C64HD1
572E SN177 HEAD DROP CAL 64
RUN NUMBER: 051895.0914;1



CHANNEL: HEDRG FILTER: CH. CLASS 1000

PEAK DATA: 254.26 G @ 2.00 MS; 0.24 G @ 6.00 MS

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

HYBRID III 18-MAY-95

TRC INC. TEST NO: 177C64NF1 572E SN177 NECK FLEXION CAL64

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	50.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	6.99 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	23.14 G
	20 MS	17.60 - 22.60 G	20.15 G
	30 MS	12.50 - 18.50 G	16.04 G
MAX PENDULUM G		29 G MAX	23.98 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	16.00 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	36.56 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	69.94 DEG.
	TIME	57 - 64 MS	58.88 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	92.09 NM
	TIME	47 - 58 MS	49.76 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	114.80 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	100.64 MS

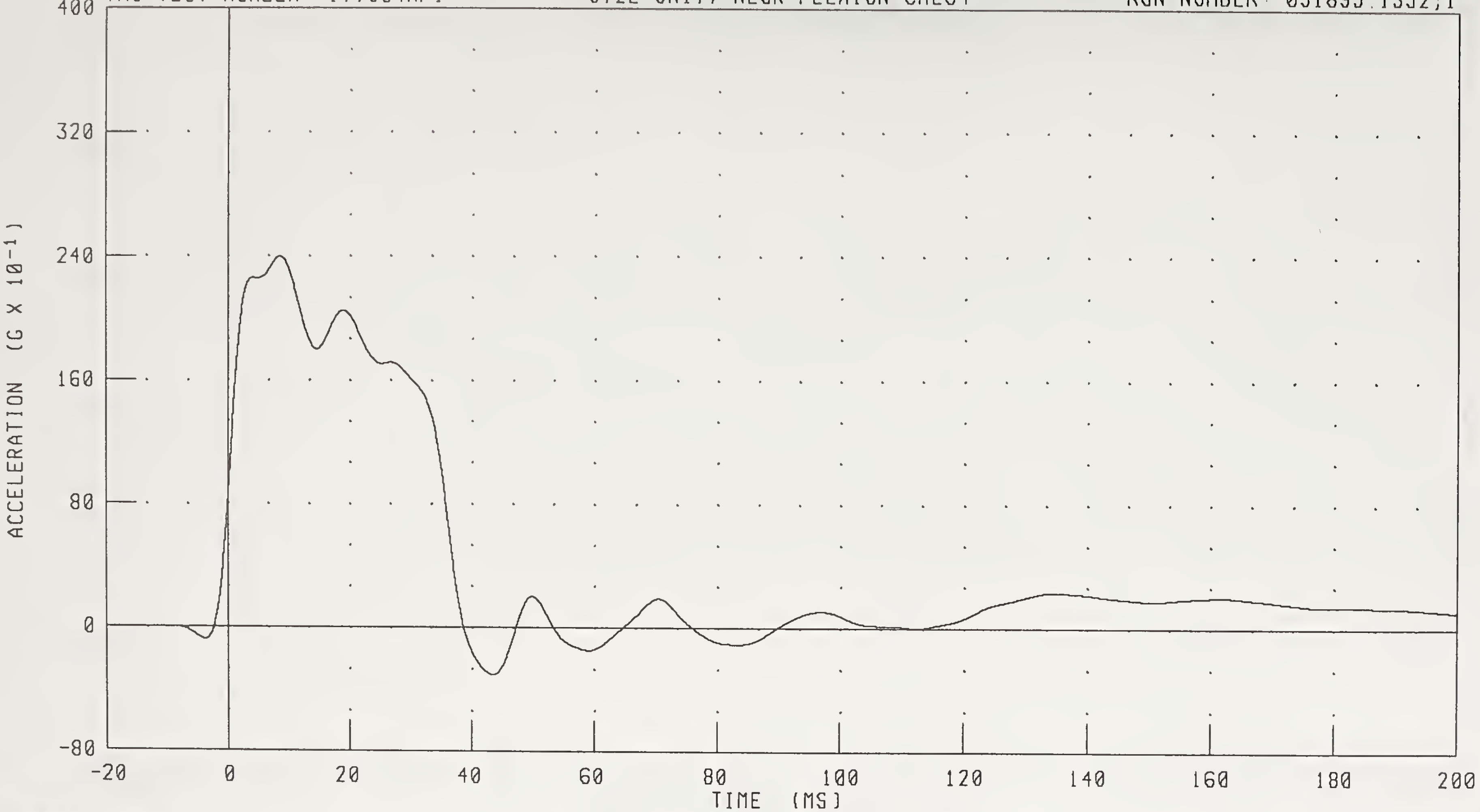
TEST MEETS SPECIFICATIONS

TECHNICIAN Pete

RUN NUMBER: 051895.1352;1

PART 572-E HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION

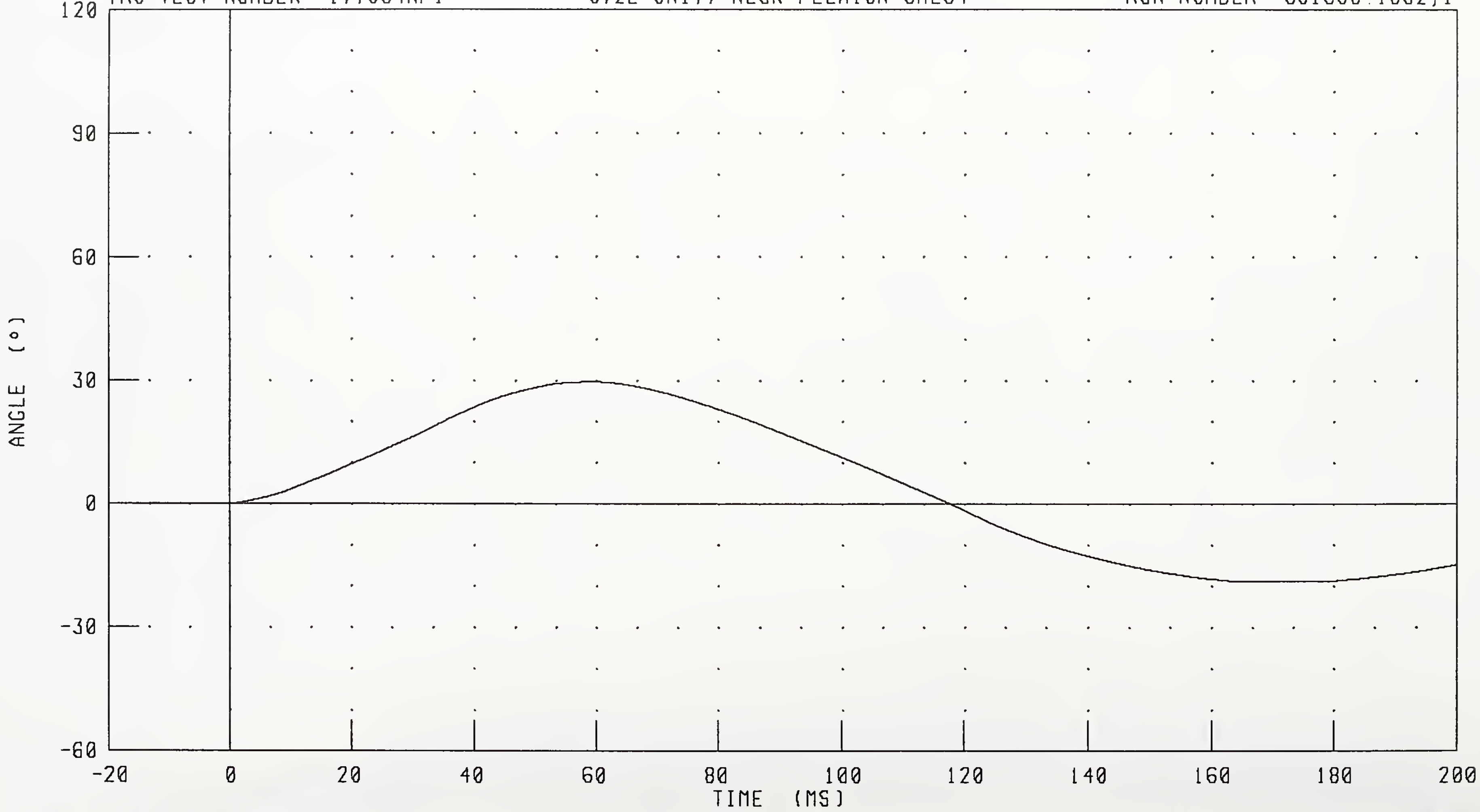
TRC TEST NUMBER: 177C64NF1 572E SN177 NECK FLEXION CAL64 RUN NUMBER: 051895.1352;1



CHANNEL: PENXG FILTER: CH. CLASS 60 PEAK DATA: 23.98 G @ 8.48 MS; -3.03 G @ 43.44 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT BASE OF NECK

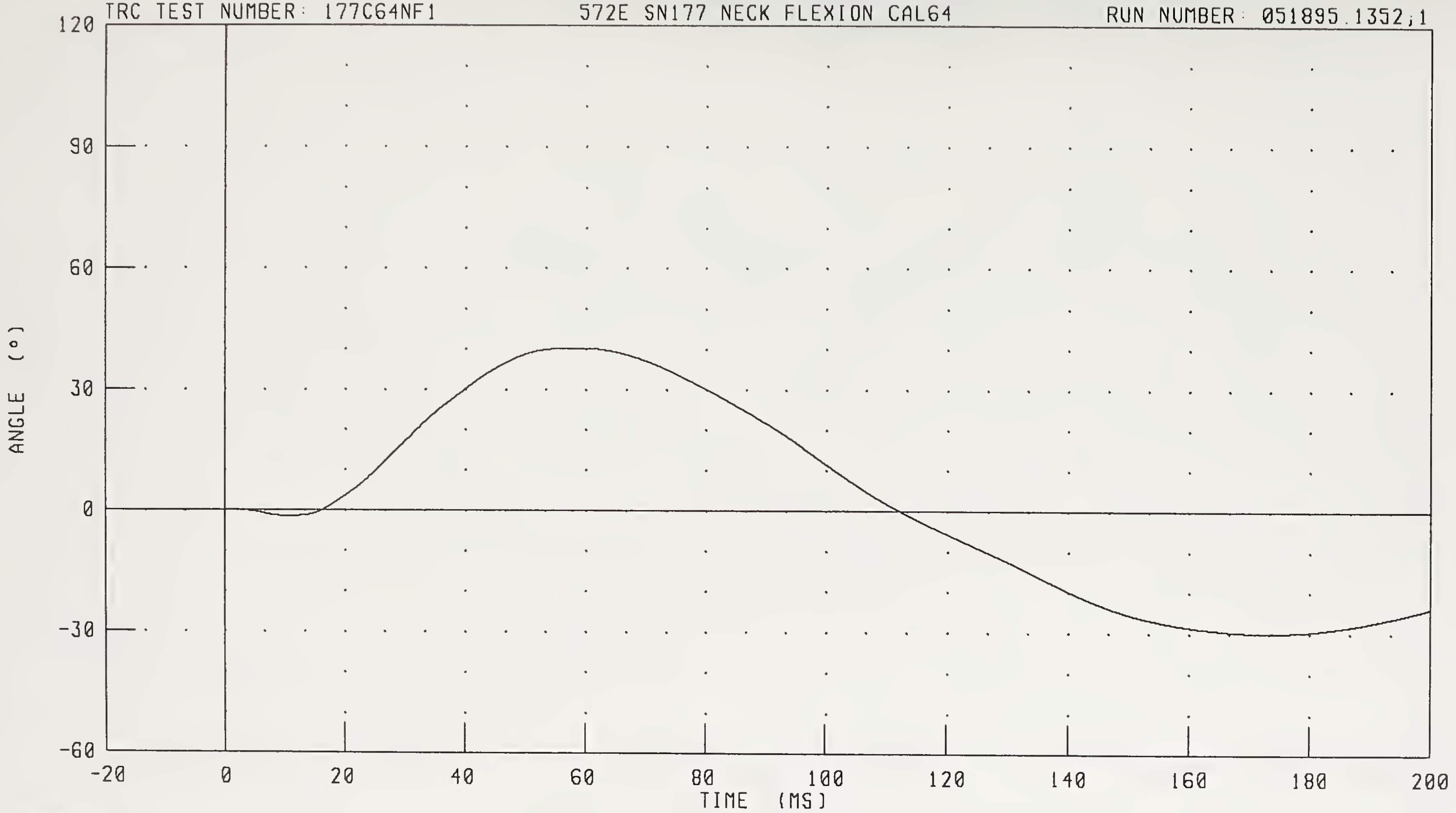
TRC TEST NUMBER: 177C64NF1
572E SN177 NECK FLEXION CAL64
RUN NUMBER: 051895.1352;1



CHANNEL: BETA
FILTER: CH. CLASS 60
PEAK DATA: 29.69 ° @ 59.12 MS; -18.87 ° @ 166.80 MS

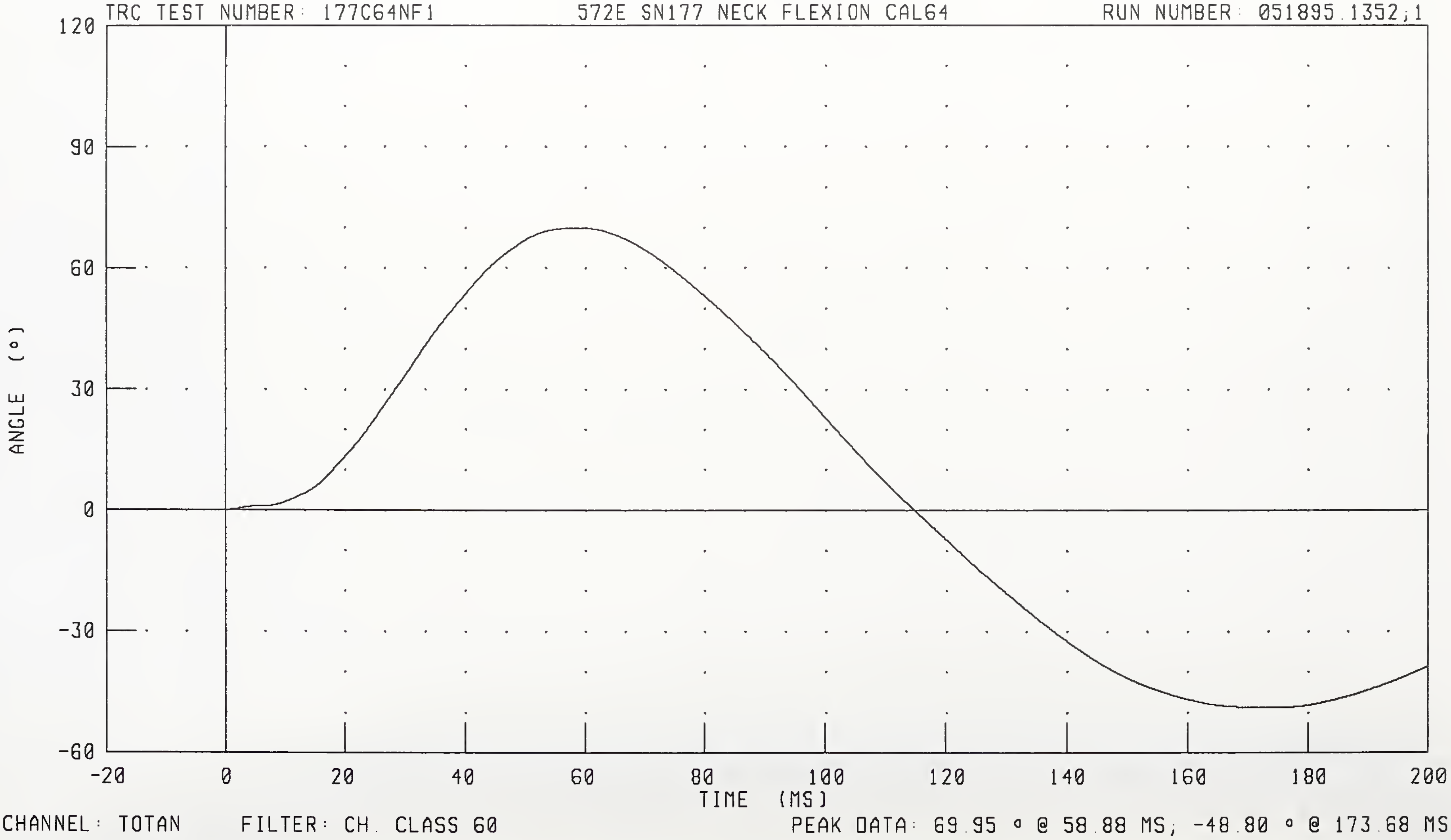
PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 177C64NF1
572E SN177 NECK FLEXION CAL64
RUN NUMBER: 051895.1352;1



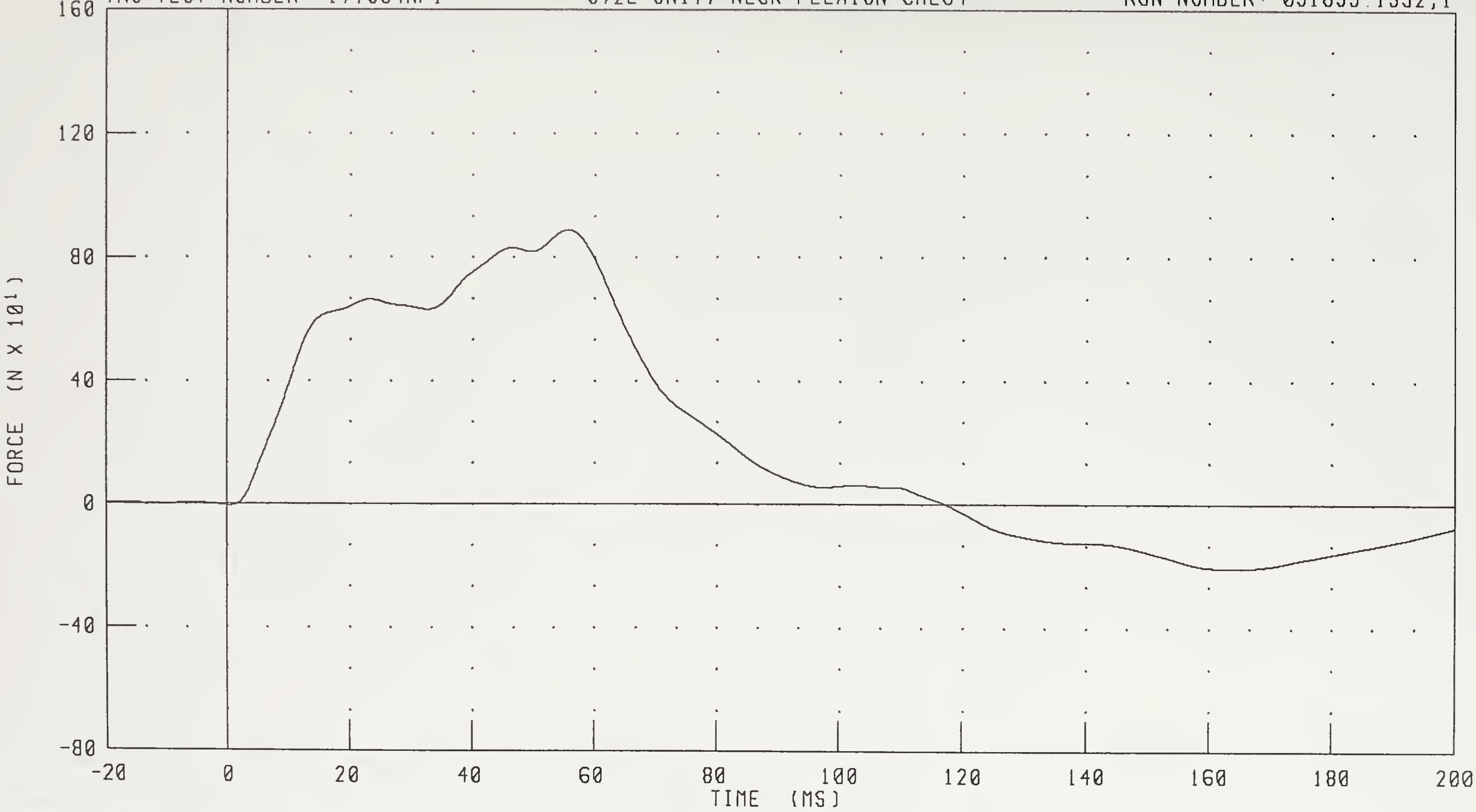
CHANNEL: THETA FILTER: CH. CLASS 60 PEAK DATA: 40.27 ° @ 58.16 MS; -29.94 ° @ 173.52 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL ROTATION



PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK FORCE X AXIS

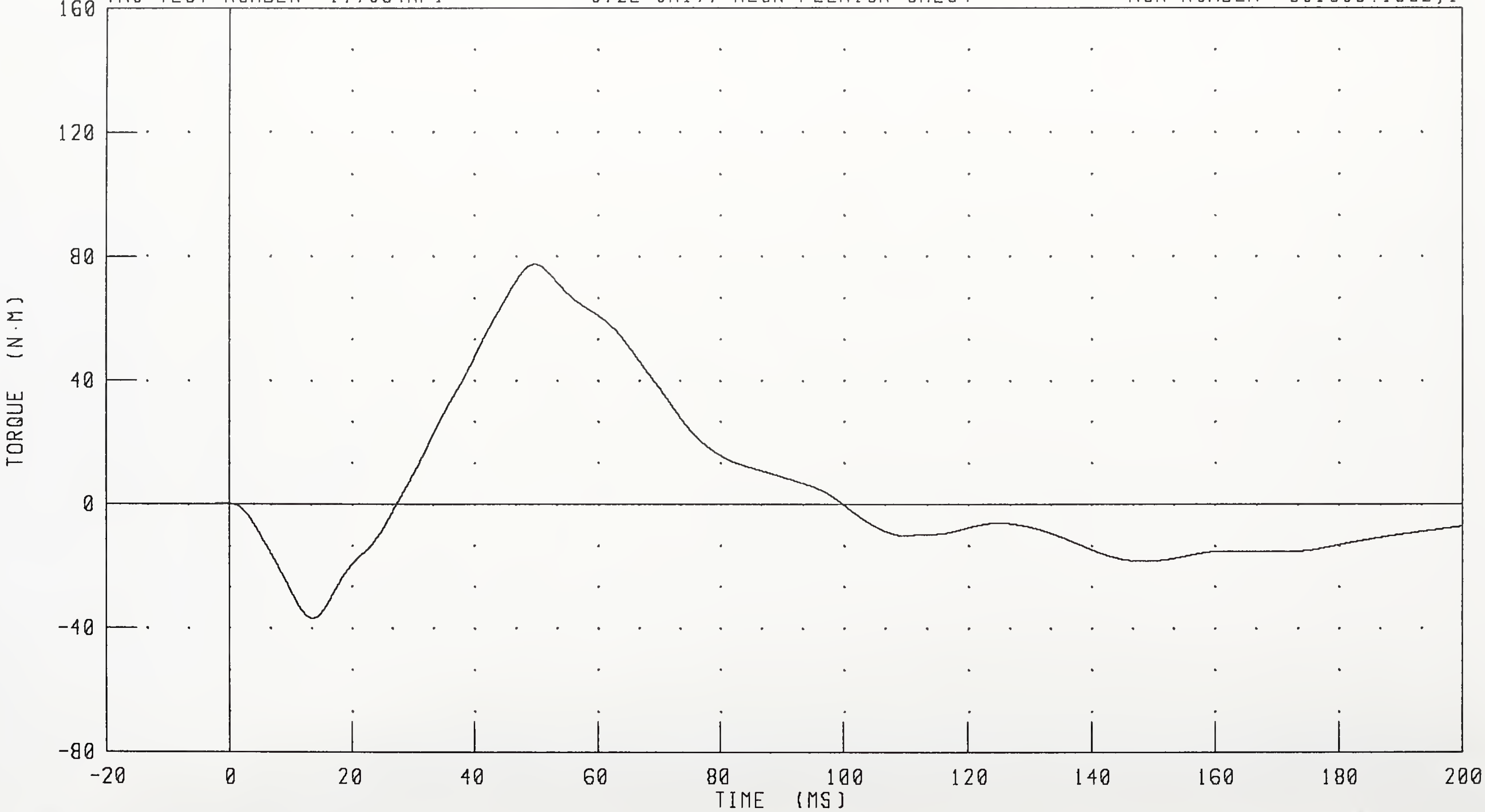
TRC TEST NUMBER: 177C64NF1 572E SN177 NECK FLEXION CAL64 RUN NUMBER: 051895.1352;1



CHANNEL: NEKXF FILTER: CH. CLASS 60 PEAK DATA: 888.93 N @ 55.68 MS; -206.90 N @ 165.04 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK MOMENT Y AXIS

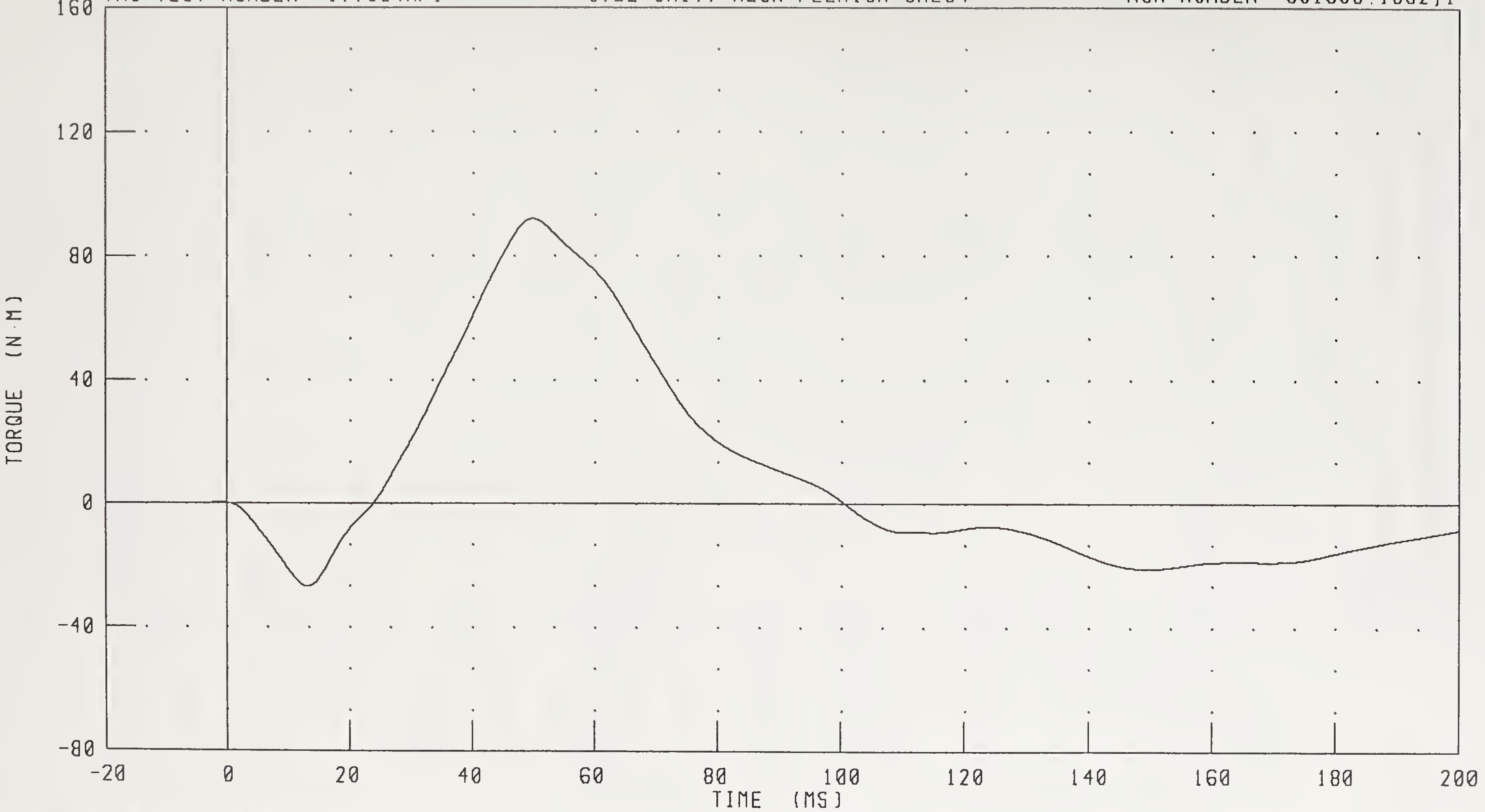
TRC TEST NUMBER: 177C64NF1 572E SN177 NECK FLEXION CAL64 RUN NUMBER: 051895.1352;1



CHANNEL: NEKYM FILTER: CH. CLASS 60 PEAK DATA: 77.53 N·M @ 49.76 MS; -36.85 N·M @ 13.60 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 177C64NF1 572E SN177 NECK FLEXION CAL64 RUN NUMBER: 051895.1352;1



CHANNEL: NEKOM FILTER: CH. CLASS 60 PEAK DATA: 92.09 N·M @ 49.76 MS; -26.80 N·M @ 13.20 MS

TRANSPORTATION RESEARCH CENTER INC.

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

HYBRID III 18-MAY-95

TRC INC. TEST NO: 177C64NE1 572E SN177 NECK EXT. CAL64

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	50.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.00 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	18.32 G
	20 MS	14.00 - 19.00 G	16.39 G
	30 MS	11.00 - 16.00 G	14.70 G
MAX PENDULUM G		22 G MAX	18.70 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	14.66 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	38.24 MS
D PLANE ROTATION	MAX	81 - 106 DEG.	96.33 DEG.
	TIME	72 - 82 MS	75.76 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-70.51 NM
	TIME	65 - 79 MS	70.48 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	154.72 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	137.12 MS

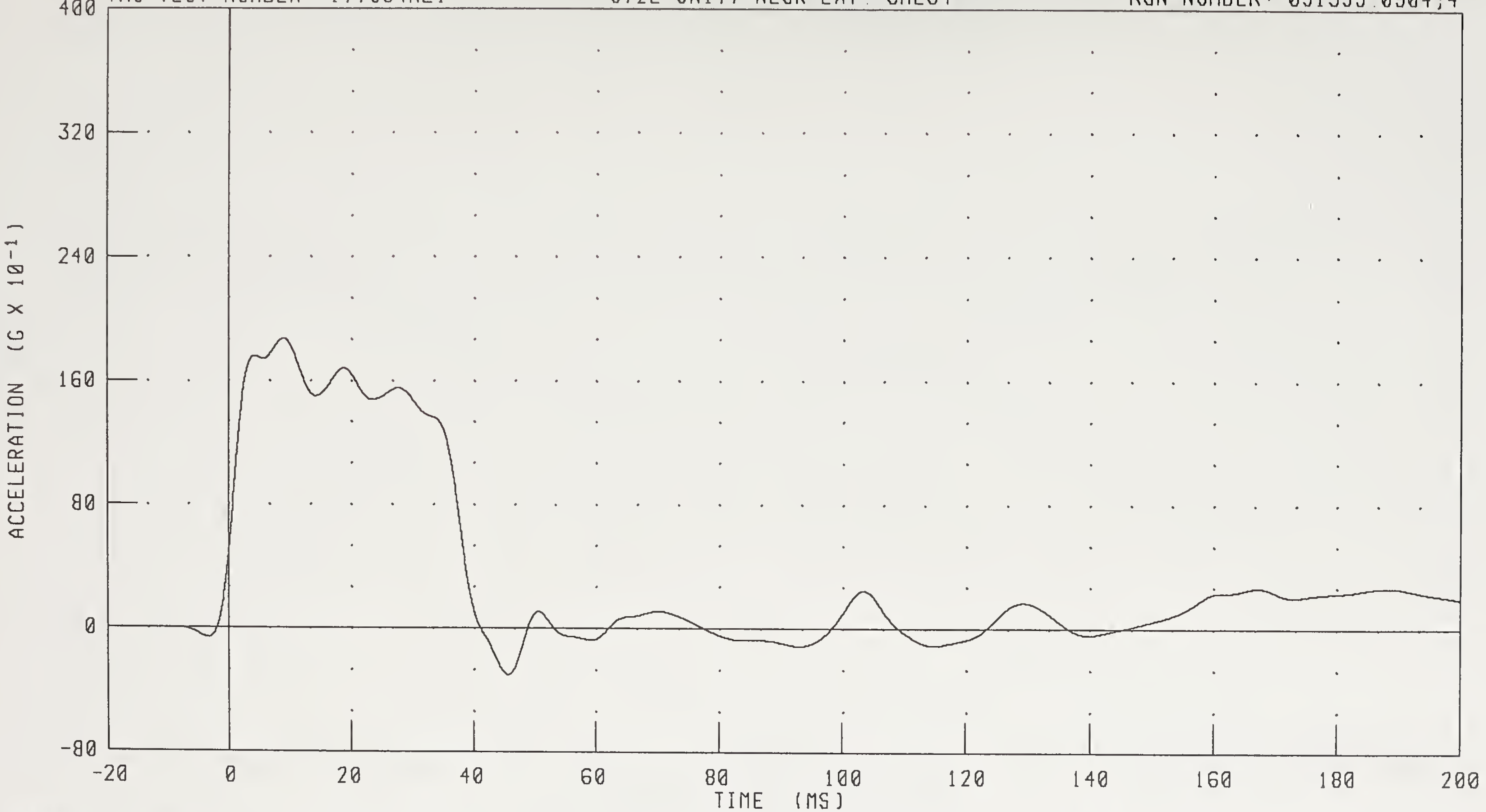
TEST MEETS SPECIFICATIONS

TECHNICIAN Pete

RUN NUMBER: 051995.0903;4

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
PENDULUM DECELERATION

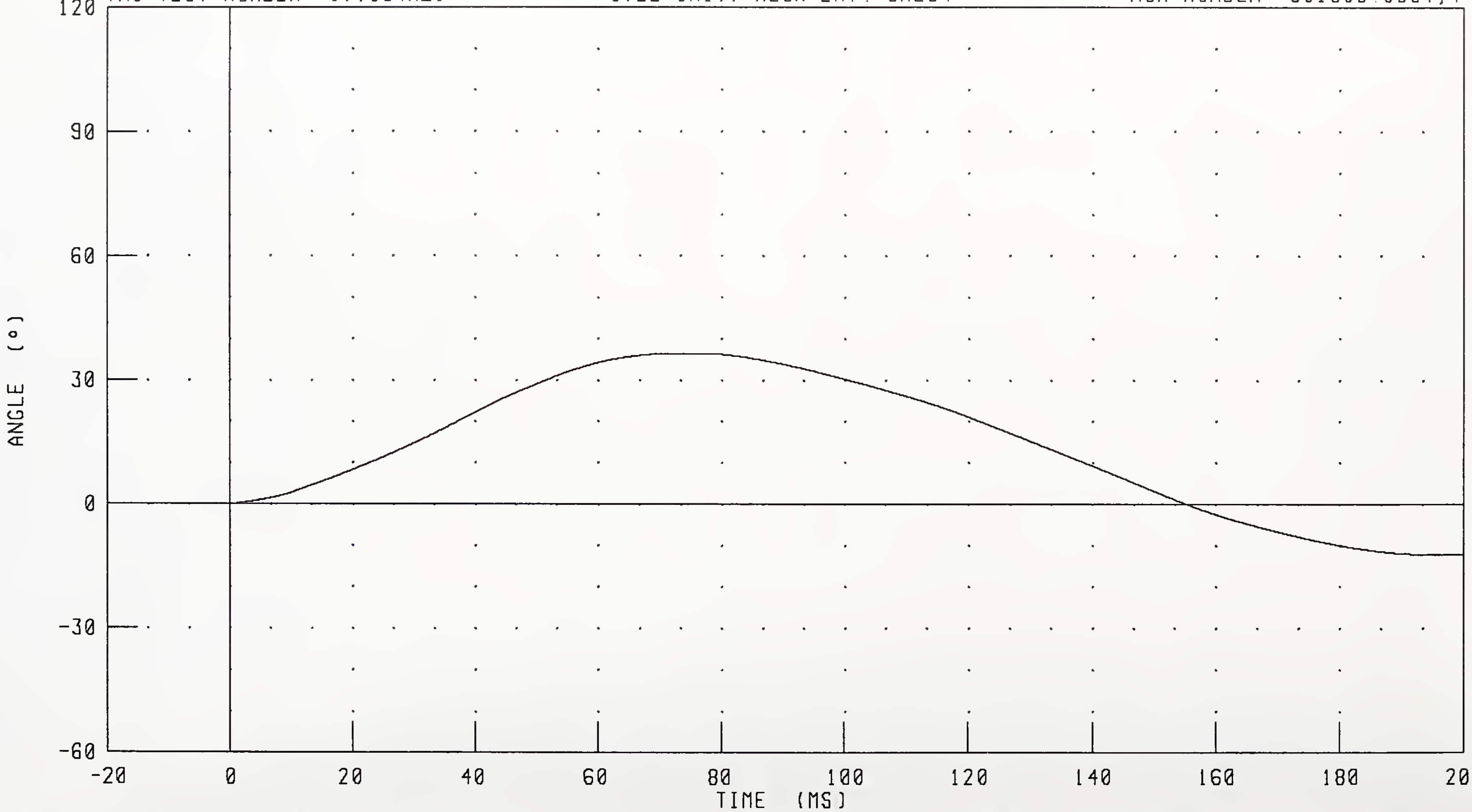
TRC TEST NUMBER: 177C64NE1　　572E SN177 NECK EXT. CAL64　　RUN NUMBER: 051995.0904;4



CHANNEL: PENXG　　FILTER: CH. CLASS 60　　PEAK DATA: 18.71 G @ 8.96 MS; -3.01 G @ 45.60 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT BASE OF NECK

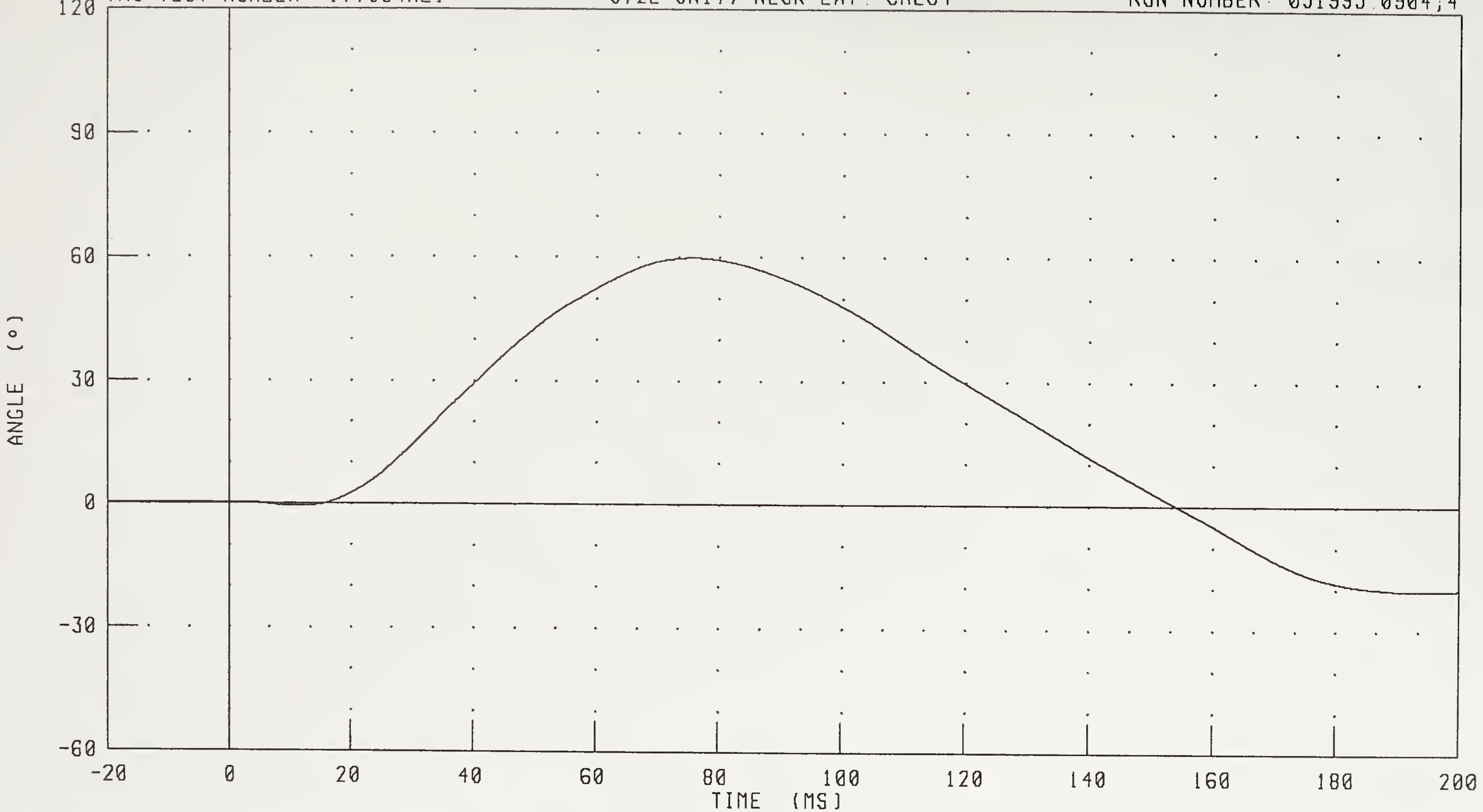
TRC TEST NUMBER: 177C64NE1
572E SN177 NECK EXT. CAL64
RUN NUMBER: 051995.0904;4



CHANNEL: BETA
FILTER: CH. CLASS 60
PEAK DATA: 36.41 ° @ 76.64 MS; -12.08 ° @ 199.92 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE

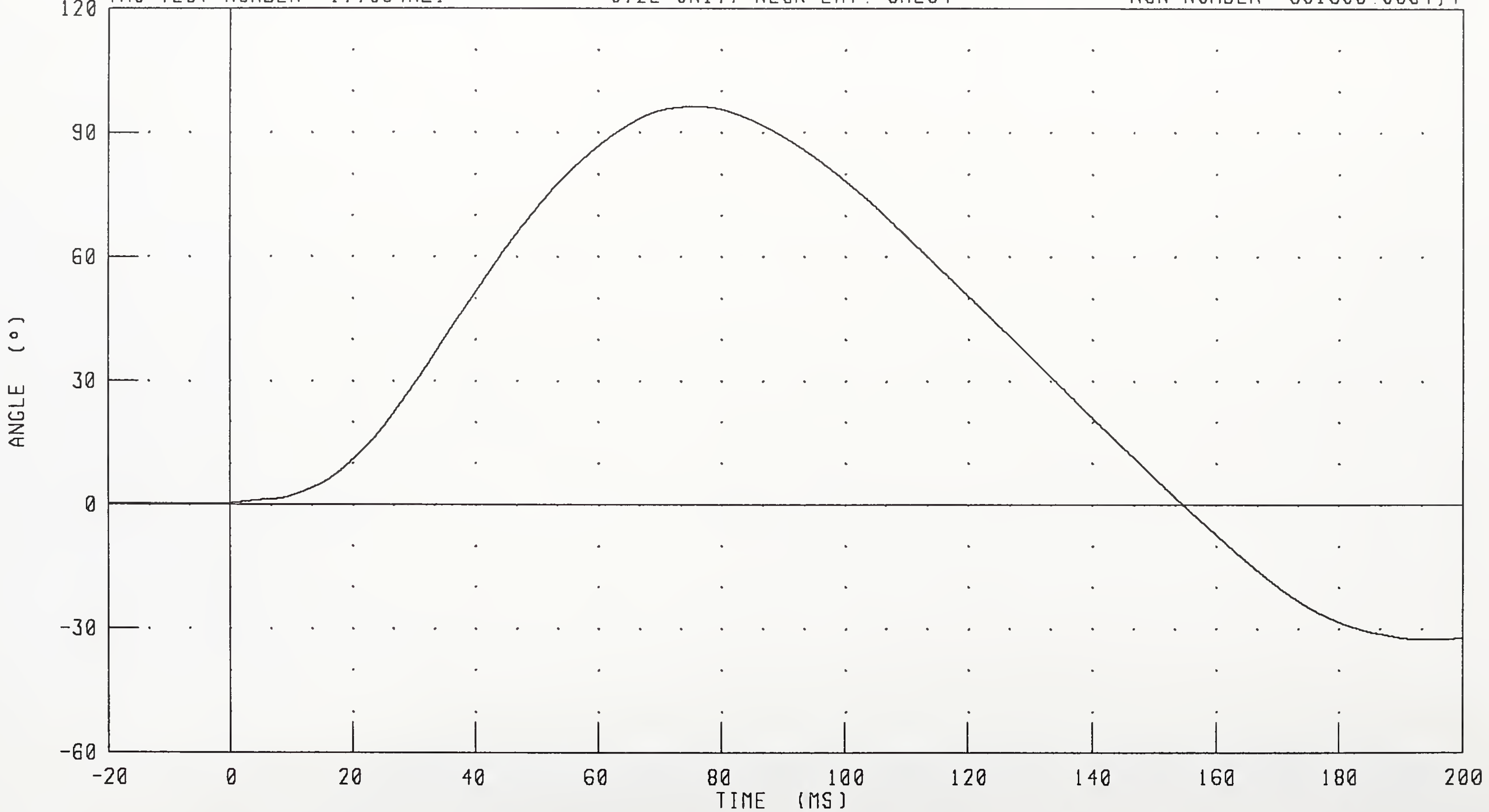
TRC TEST NUMBER: 177C64NE1 572E SN177 NECK EXT. CAL64 RUN NUMBER: 051995.0904;4



CHANNEL: THETA FILTER: CH. CLASS 60 PEAK DATA: 59.93 ° @ 75.68 MS; -20.40 ° @ 194.72 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL ROTATION

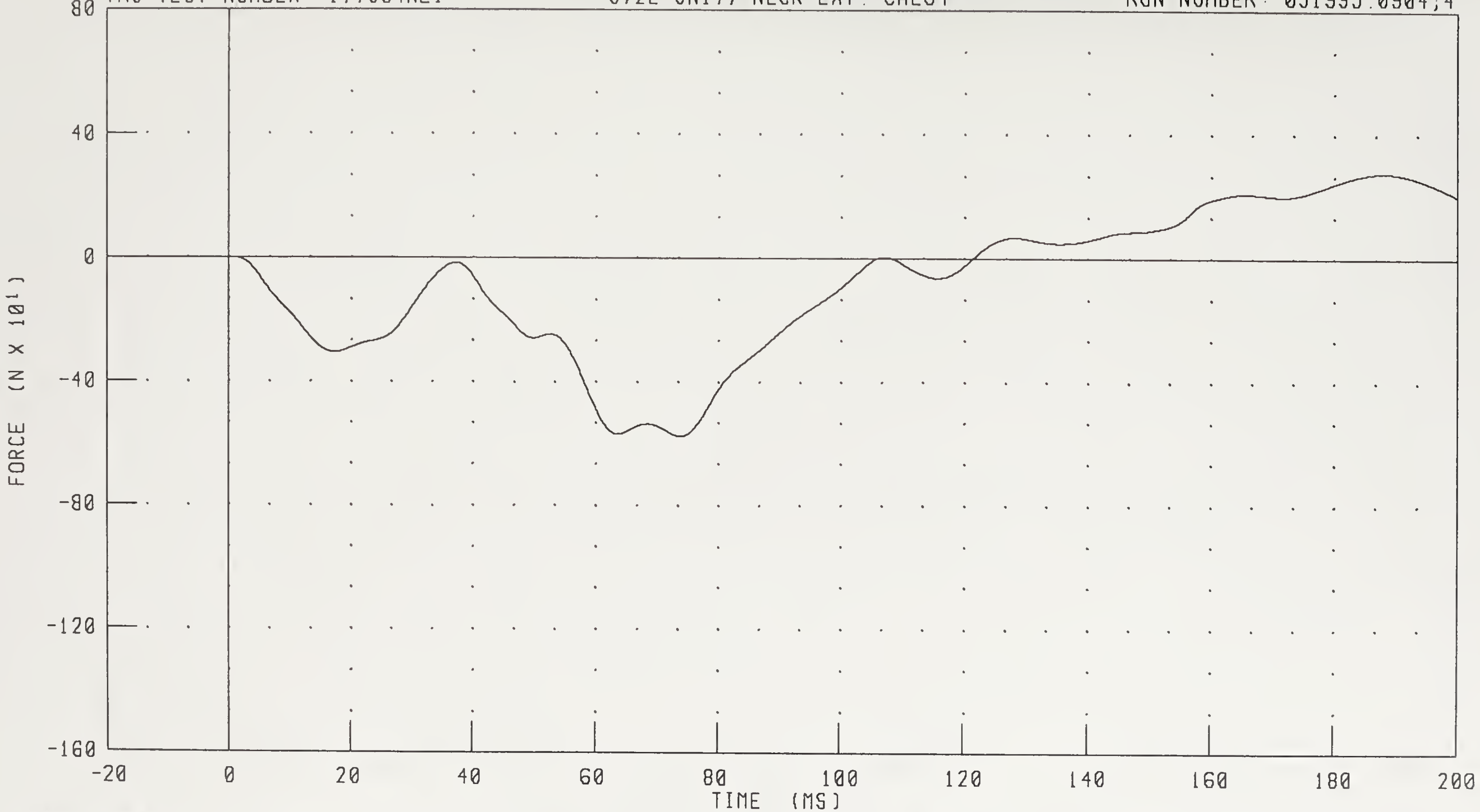
TRC TEST NUMBER: 177C64NE1 572E SN177 NECK EXT. CAL64 RUN NUMBER: 051995.0904;4



CHANNEL: TOTAN FILTER: CH. CLASS 60 PEAK DATA: 96.34 ° @ 75.76 MS; -32.46 ° @ 193.60 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
NECK FORCE X AXIS

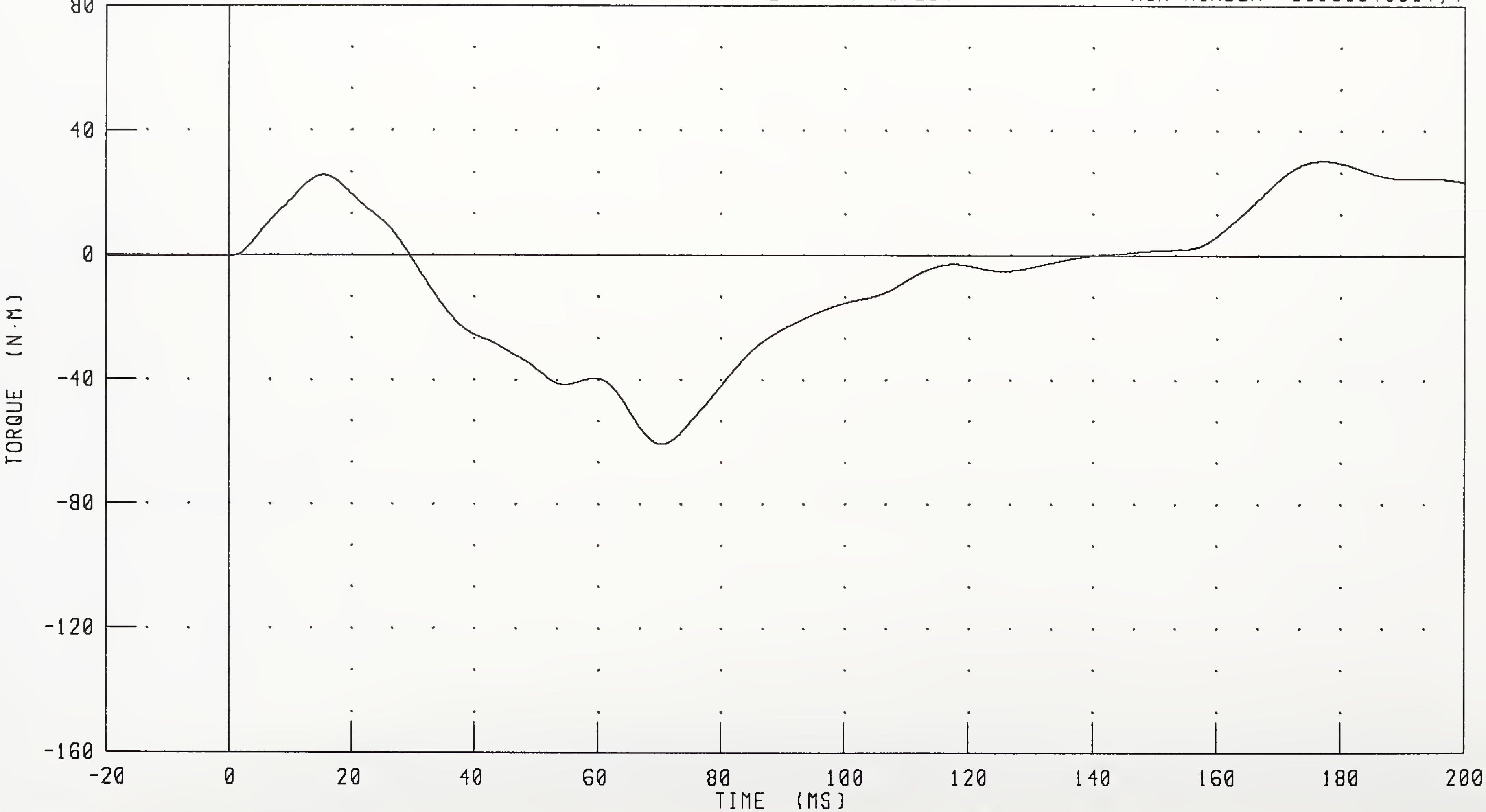
TRC TEST NUMBER: 177C64NE1 572E SN177 NECK EXT. CAL64 RUN NUMBER: 051995.0904;4



CHANNEL: NEKXF FILTER: CH. CLASS 60 PEAK DATA: 277.23 N @ 187.84 MS; -577.13 N @ 73.76 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
NECK MOMENT Y AXIS

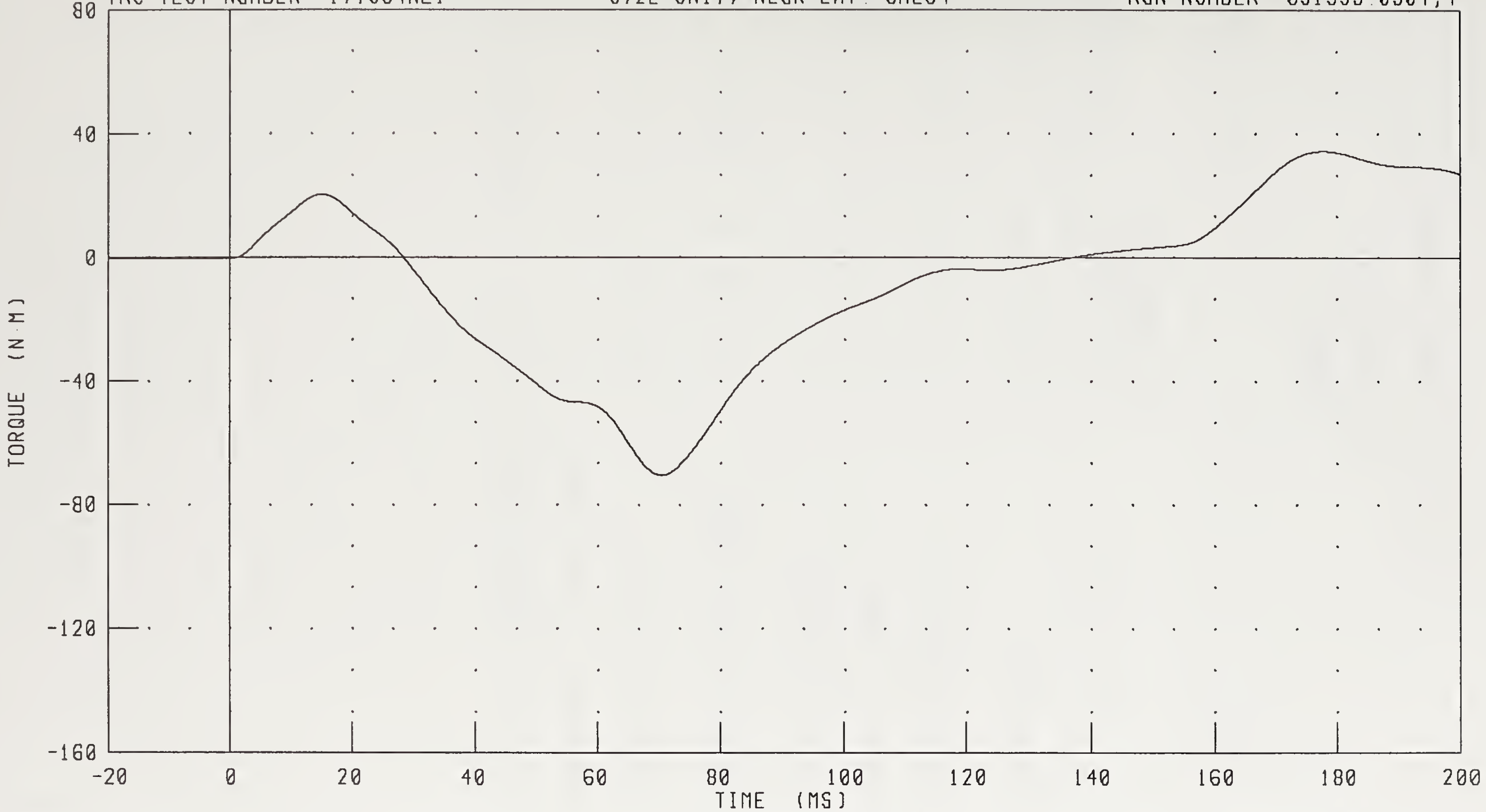
TRC TEST NUMBER: 177C64NE1 572E SN177 NECK EXT. CAL64 RUN NUMBER: 051995.0904;4



CHANNEL: NEKYM FILTER: CH. CLASS 60 PEAK DATA: 30.40 N·M @ 177.20 MS; -60.78 N M @ 70.32 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 177C64NE1 572E SN177 NECK EXT. CAL64 RUN NUMBER: 051995.0904;4



CHANNEL: NEKOM FILTER: CH. CLASS 60 PEAK DATA: 34.40 N·M @ 177 76 MS; -70.51 N·M @ 70.48 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III 19-MAY-95

TRC INC. TEST NO: 177C64TH1 572E SN177 H.S.THORAX CAL64

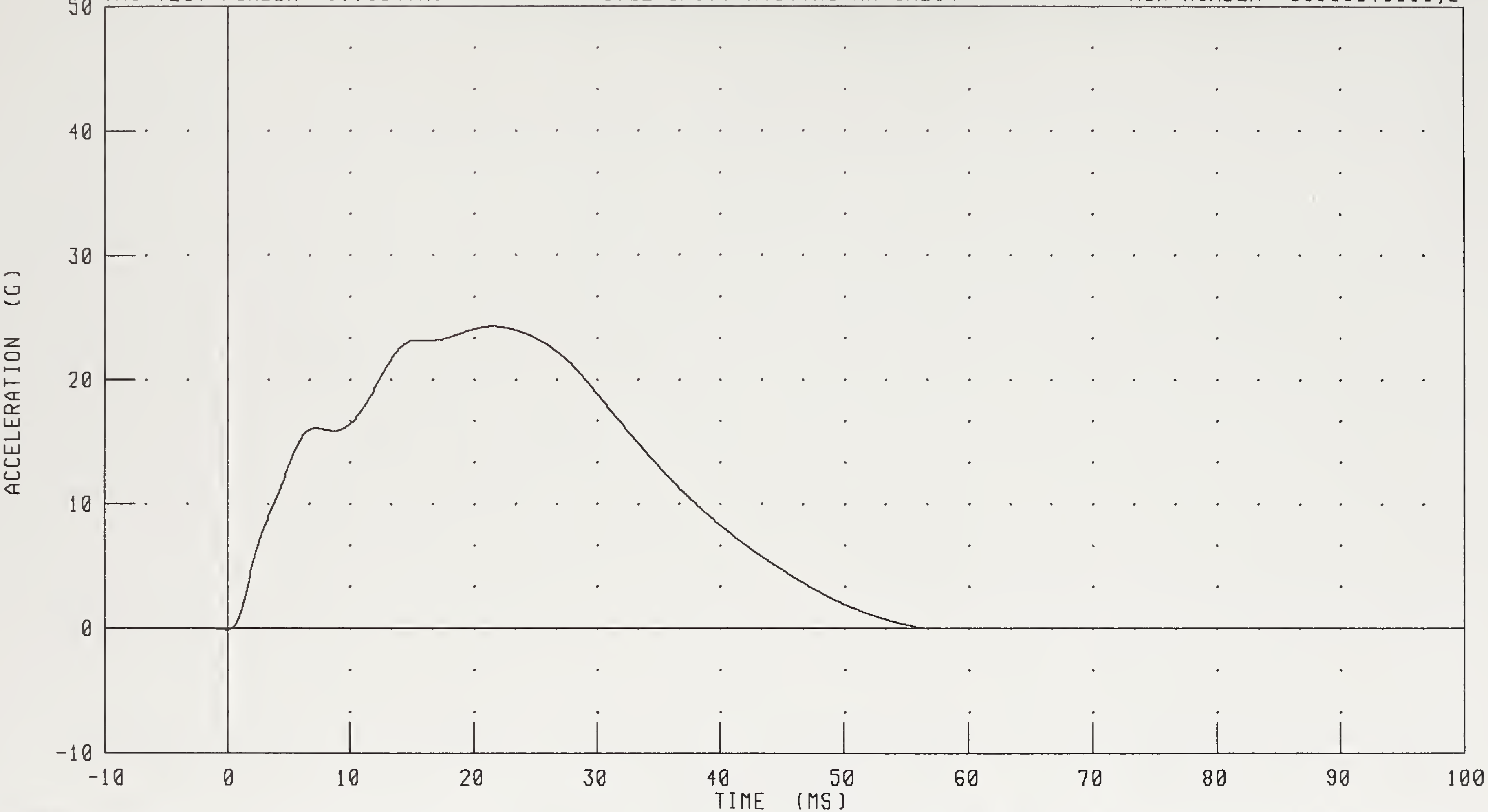
TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	50.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.71 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	68.8 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5565. N
INTERNAL HYSTERESIS	69% - 85%	71.5%

TEST MEETS SPECIFICATIONS

TECHNICIAN____________________ RUN NUMBER: 051995.0818;2

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION

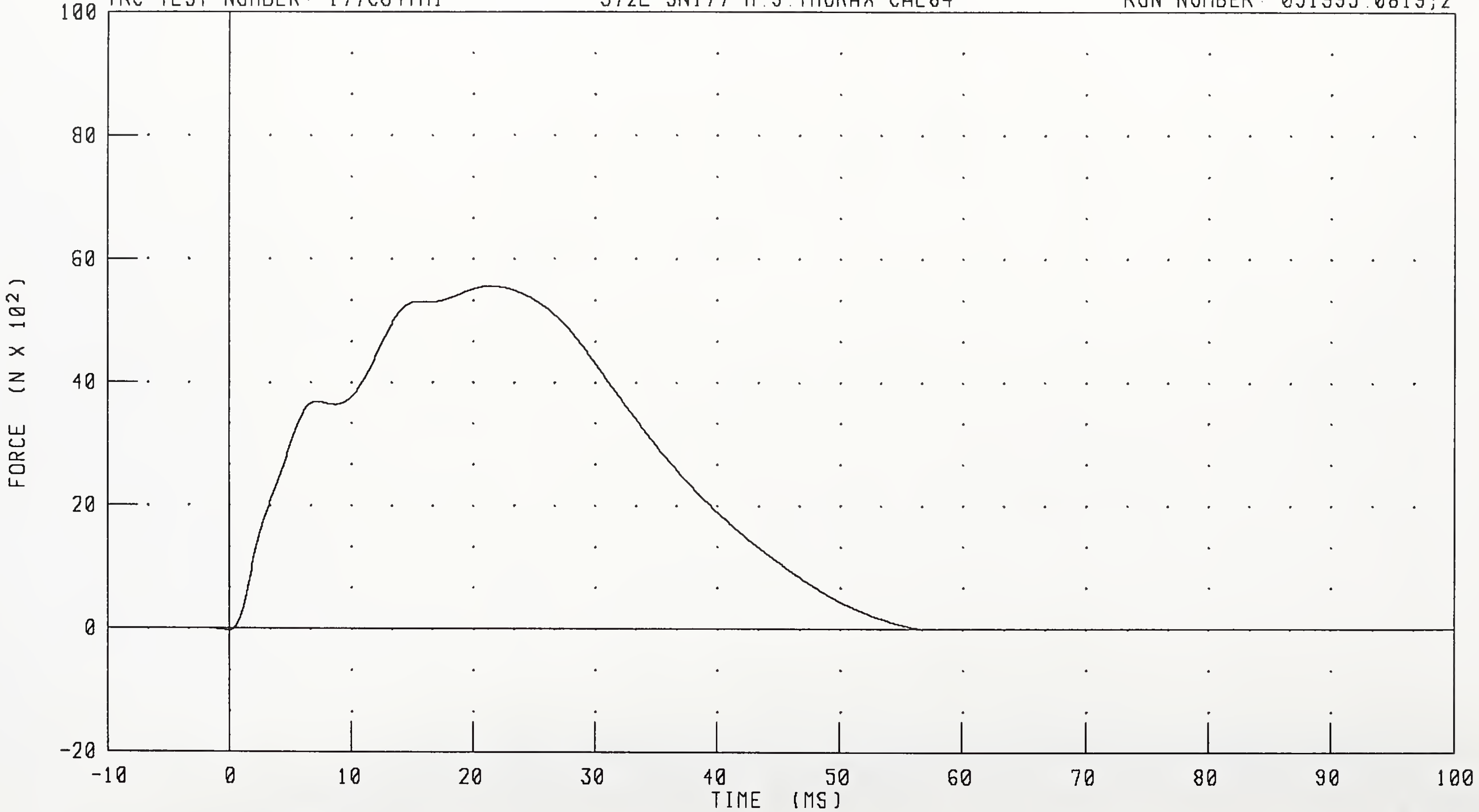
TRC TEST NUMBER: 177C64TH1 572E SN177 H.S.THORAX CAL64 RUN NUMBER: 051995.0819;2



CHANNEL: PENXG FILTER: CH. CLASS 180 PEAK DATA: 24.29 G @ 21.44 MS; -0.11 G @ -0.08 MS

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM FORCE

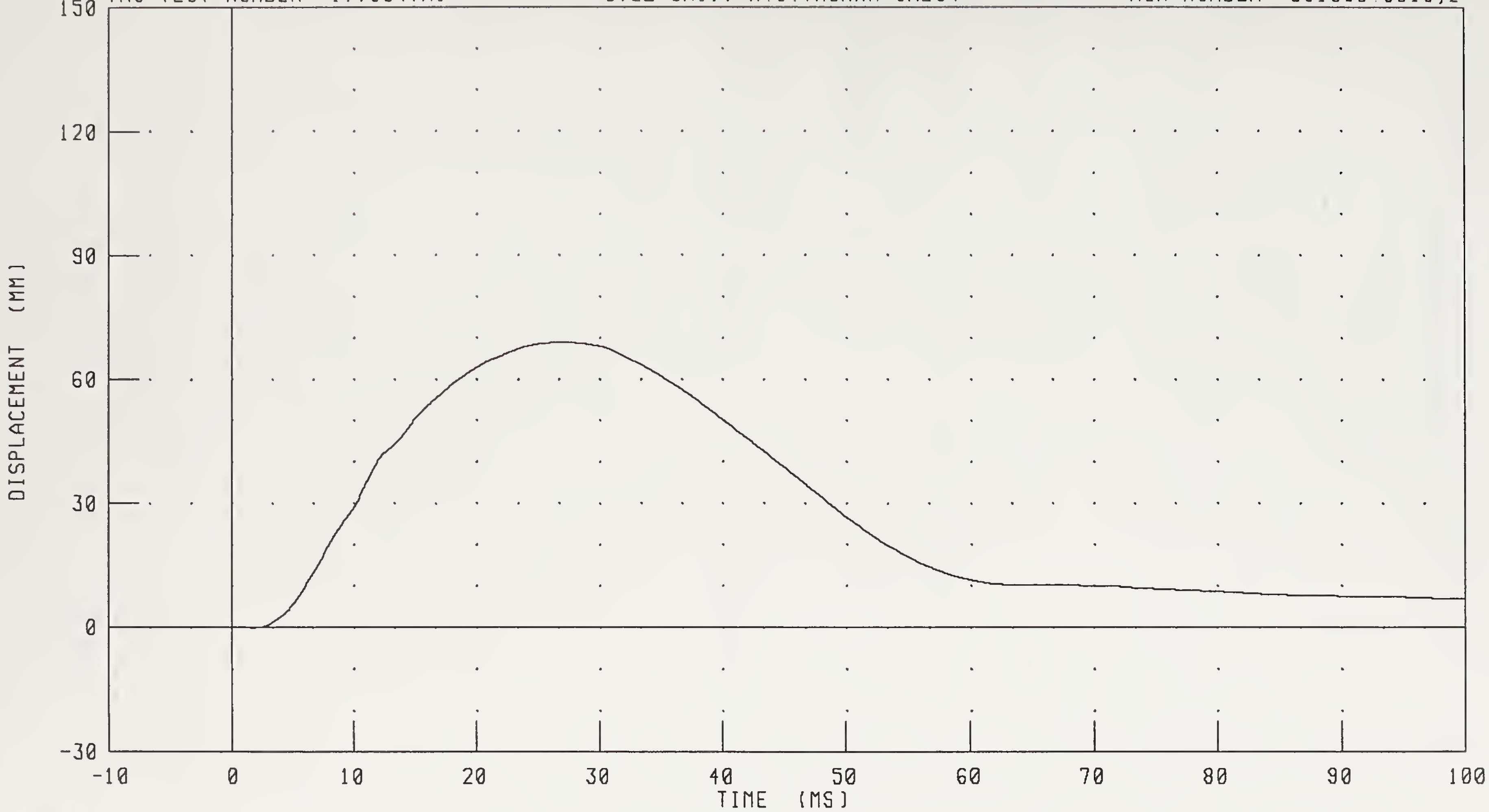
TRC TEST NUMBER: 177C64TH1 572E SN177 H.S.THORAX CAL64 RUN NUMBER: 051995.0819;2



CHANNEL: PENXF FILTER: CH. CLASS 180 PEAK DATA: 5565.14 N @ 21.44 MS; -24.68 N @ -0.08 MS

PART 572-E HYBRID III THORAX CALIBRATION
STERNUM DISPLACEMENT

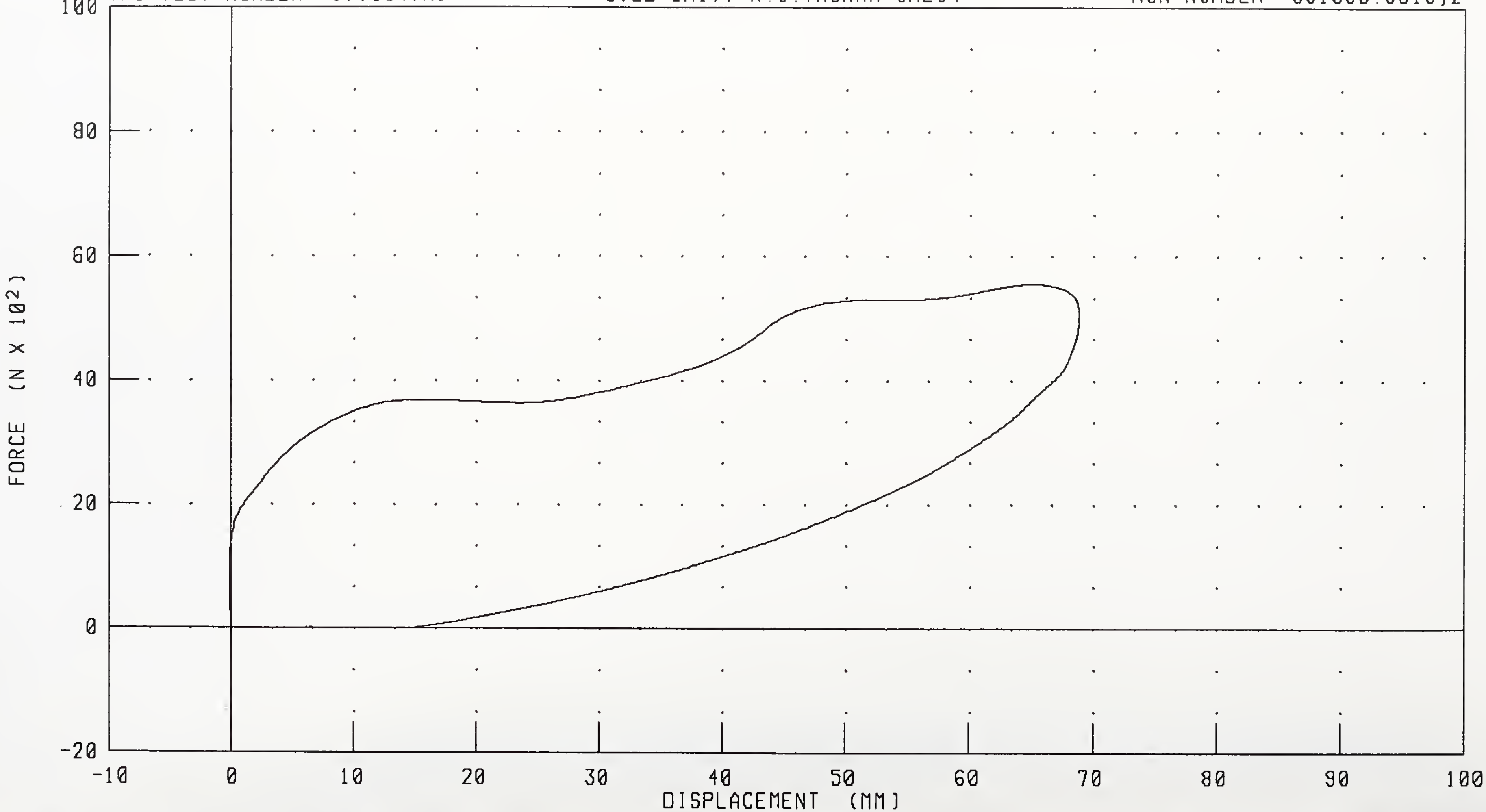
TRC TEST NUMBER: 177C64TH1 572E SN177 H.S.THORAX CAL64 RUN NUMBER: 051995.0819;2



CHANNEL: CSTXD FILTER: CH. CLASS 180 PEAK DATA: 68.85 MM @ 27.12 MS; -0.07 MM @ 1.76 MS

PART 572-E HYBRID III THORAX CALIBRATION
CHEST DISPLACEMENT VS PENDULUM FORCE

TRC TEST NUMBER: 177C64TH1 572E SN177 H.S.THORAX CAL64 RUN NUMBER: 051995.0819;2



CHANNEL: CSTXD
PENXF

FILTER: CH. CLASS 180
CH. CLASS 180

PEAK DATA: 68.85 MM @ 27.12 MS; -0.07 MM @ 1.76 MS
5565.14 N @ 21.44 MS; -24.68 N @ -0.08 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III

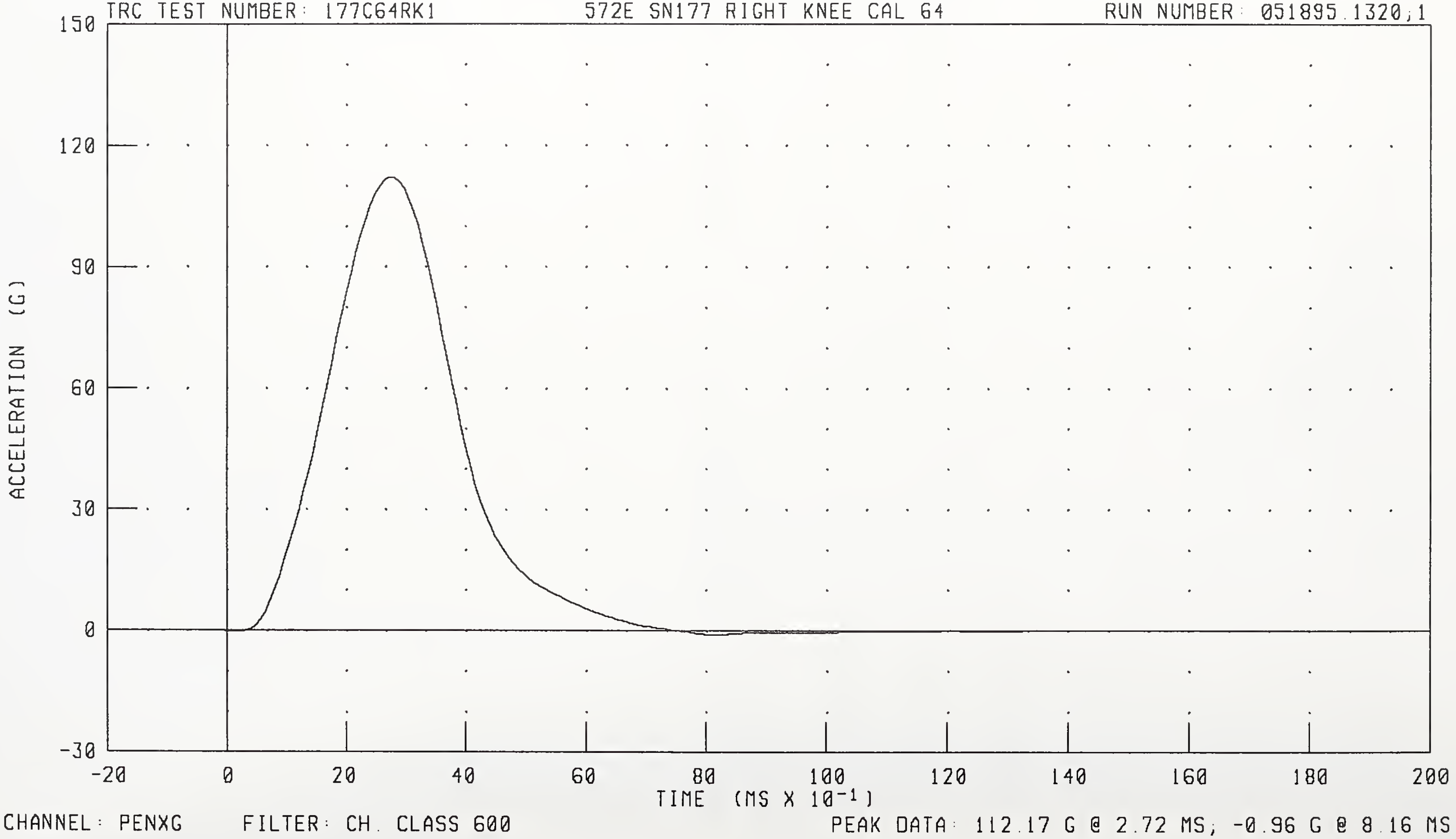
18-MAY-95

TRC INC. TEST NO: 177C64RK1 572E SN177 RIGHT KNEE CAL 64

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	50.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5488.1 N

TEST MEETS SPECIFICATIONS

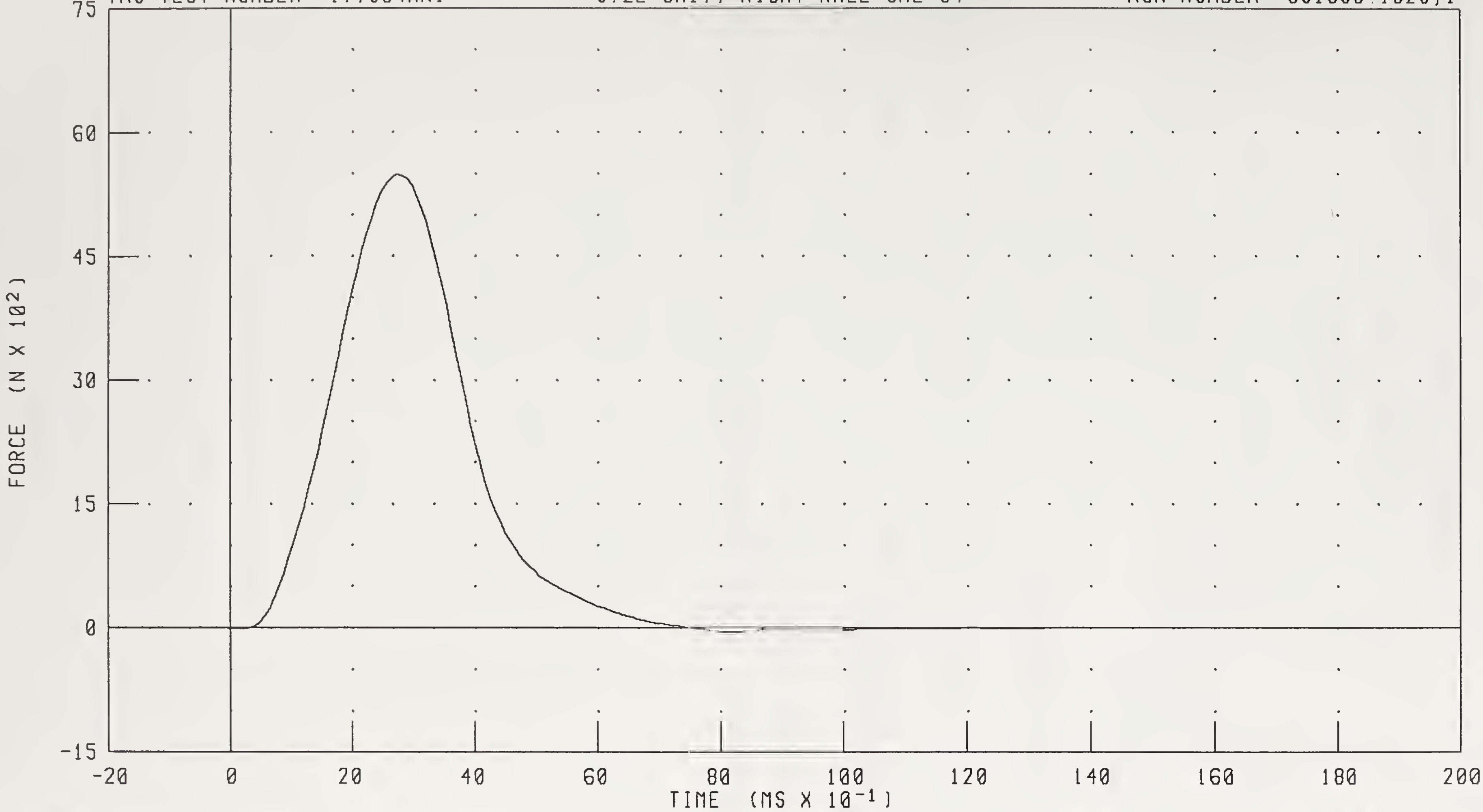
TECHNICIAN______________ RUN NUMBER: 051895.1318;1



PART 572-E HYBRID III RIGHT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)

PART 572-E HYBRID III RIGHT KNEE CALIBRATION
PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 177C64RK1 572E SN177 RIGHT KNEE CAL 64 RUN NUMBER: 051895.1320,1



CHANNEL: PENXF FILTER: CH. CLASS 600 PEAK DATA: 5488.20 N @ 2.72 MS; -46.99 N @ 8.16 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III 18-MAY-95

TRC INC. TEST NO: 177C64LK1 572E SN177 LEFT KNEE CAL 64

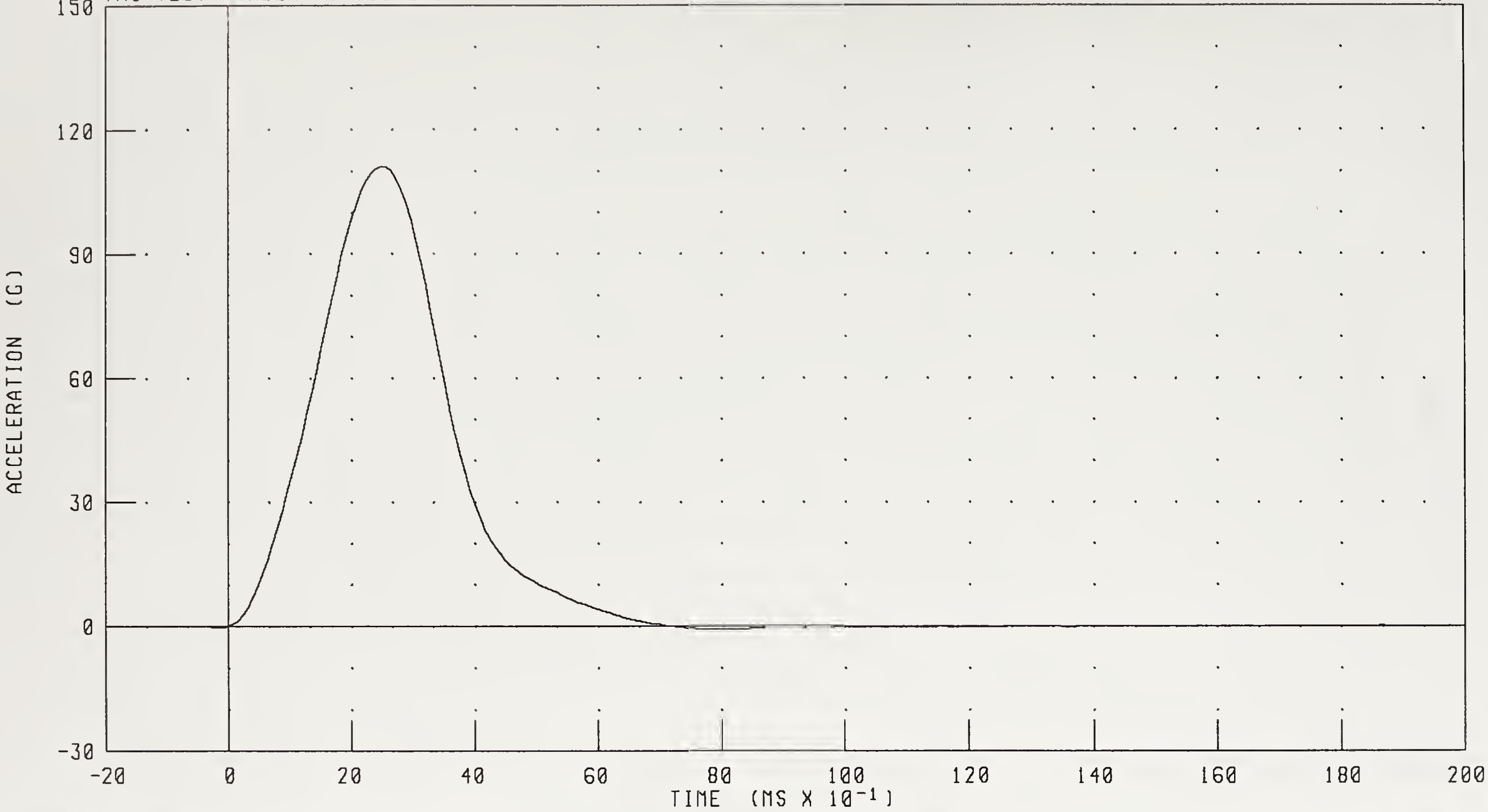
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	50.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5439.8 N

TEST MEETS SPECIFICATIONS

TECHNICIAN ________________ RUN NUMBER: 051895.1308;1

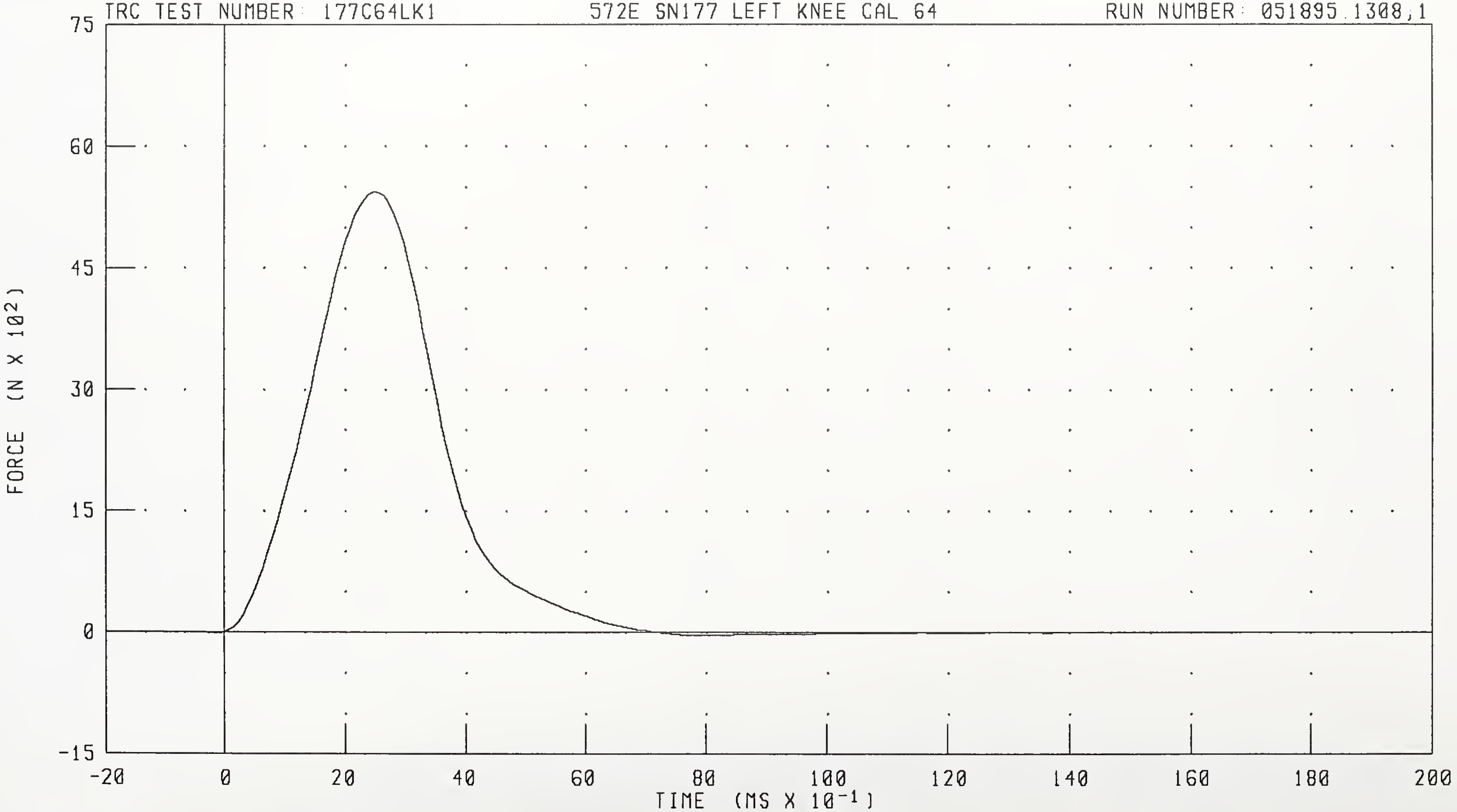
PART 572-E HYBRID III LEFT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)

TRC TEST NUMBER: 177C64LK1 572E SN177 LEFT KNEE CAL 64 RUN NUMBER: 051895.1308;1



CHANNEL: PENXG FILTER: CH. CLASS 600 PEAK DATA: 111.18 G @ 2.48 MS; -0.79 G @ 8.00 MS

PART 572-E HYBRID III LEFT KNEE CALIBRATION
PENDULUM FORCE (5 KG PEND.)



CHANNEL: PENXF FILTER: CH. CLASS 600 PEAK DATA: 5439.80 N @ 2.48 MS; -38.50 N @ 8.00 MS

Appendix D

Miscellaneous Test Information

Dummy Instrumentation Placement

Dummy Manufacturer: Humanoid Systems

Dummy Serial Number: 083

Seating Position: Driver

Mnemonic	Location	Axis	Mfr.	Model	S/N	Orientation (+ Sensing)
HEDXG1	Head Acceleration	X	Endevco	7231C	AH5B6	Rear
HEDYG1	Head Acceleration	Y	Endevco	7231C	AH5G8	Left
HEDZG1	Head Acceleration	Z	Endevco	7231C	AH5H7	Up
CSTXG1	Chest Acceleration	X	Endevco	7231C	AH5B1	Forward
CSTYG1	Chest Acceleration	Y	Endevco	7231C	AH469	Left
CSTZG1	Chest Acceleration	Z	Endevco	7231C	AH425	Down
CSTXD1	Chest Displacement	X	Servo	14CB1-2981	9126	Outward
LFMF1	Left Femur Force		Denton	2121	0162	Tension
RFMF1	Right Femur Force		Denton	2121	0163	Tension

Dummy Instrumentation Placement

Dummy Manufacturer: Alderson Research Labs

Dummy Serial Number: 177

Seating Position: Right Front Passenger

Mnemonic	Location	Axis	Mfr.	Model	S/N	Orientation (+ Sensing)
HEDXG2	Head Acceleration	X	Endevco	7231C	A45E	Rear
HEDYG2	Head Acceleration	Y	Endevco	7231C	A76D	Left
HEDZG2	Head Acceleration	Z	Endevco	7231C	A87F	Up
CSTXG2	Chest Acceleration	X	Endevco	7231C	A01E	Forward
CSTYG2	Chest Acceleration	Y	Endevco	7231C	A28A	Left
CSTZG2	Chest Acceleration	Z	Endevco	7231C	FC02	Down
CSTXD2	Chest Displacement	X	Vernitech	81422A	CP2981	Outward
LFMF2	Left Femur Force		Denton	2121	0160	Tension
RFMF2	Right Femur Force		Denton	2121	0161	Tension

Vehicle Instrumentation Placement

Mnemonic	Location	Axis	Mfr.	Model	S/N	Orientation (+ Sensing)
TLRXG1	Left Rear Seat	X	Endevco	7264	AJ798	Rearward
TRRXG1	Right Rear Seat	X	Endevco	7264	AJ454	Rearward
FFCXG1	Front Bulkhead Center	X	Endevco	7264	AJ790	Forward
FFCZG1	Front Bulkhead Center	Z	Endevco	7264	AJ7K0	Up
BCRXG1	Right Brake Caliper	X	Endevco	7264	AJ8C5	Rearward
BCLXG1	Left Brake Caliper	X	Endevco	7264	AJ7F8	Forward
DPCXG1	Dash Panel Center	X	Endevco	7264	AJ452	Forward
TFCXG1	Rear Battery Box Compartment	X	Endevco	7264	AJ708	Forward
TFCZG1	Rear Battery Box Compartmen	Z	Endevco	7264	AJ7W9	Up

Post-test Driver Dummy Inspection Checklist

Type: Hybrid III

Serial Number: 083

Inspected by: John Clarridge

Date: 06/06/95

Part	Items Checked	Comments
Skin	visual inspection	OK
Head	visual, ballast, accelerometer mount	OK
Neck	visual, cable torque, nodding blocks	OK
Clavicles	visual, bumpers, range of motion	OK
Arms/hands	visual, bumpers, range of motion	OK
Spine box	visual, ballast, weldment, accelerometer mount	OK
Rib cage	visual, measure, stiffeners	OK
Sternum	visual, bumpers	OK
Lumbar spine	visual, cable torque	OK
Abdomen	visual	OK
Pelvis	visual, palpate, accelerometer mount	OK
Upper legs	visual, load cell bolts	OK
Knees	visual, stops, inserts, sliders	OK
Lower legs	visual, range of motion	OK
Ankles	visual, range of motion	OK
Feet	visual, range of motion	OK
Joints	1 to 2 g range	OK
Other		

Notes: (include component/problem/action/reason): None

Post-test Passenger Dummy Inspection Checklist

Type: Hybrid III

Serial Number: 177

Inspected by: John Clarridge

Date: 06/06/95

Part	Items Checked	Comments
Skin	visual inspection	OK
Head	visual, ballast, accelerometer mount	OK
Neck	visual, cable torque, nodding blocks	OK
Clavicles	visual, bumpers, range of motion	OK
Arms/hands	visual, bumpers, range of motion	OK
Spine box	visual, ballast, weldment, accelerometer mount	OK
Rib cage	visual, measure, stiffeners	OK
Sternum	visual, bumpers	OK
Lumbar spine	visual, cable torque	OK
Abdomen	visual	OK
Pelvis	visual, palpate, accelerometer mount	*
Upper legs	visual, load cell bolts	OK
Knees	visual, stops, inserts, sliders	OK
Lower legs	visual, range of motion	OK
Ankles	visual, range of motion	OK
Feet	visual, range of motion	OK
Joints	1 to 2 g range	OK
Other		

Notes: (include component/problem/action/reason): None

Sign Convention

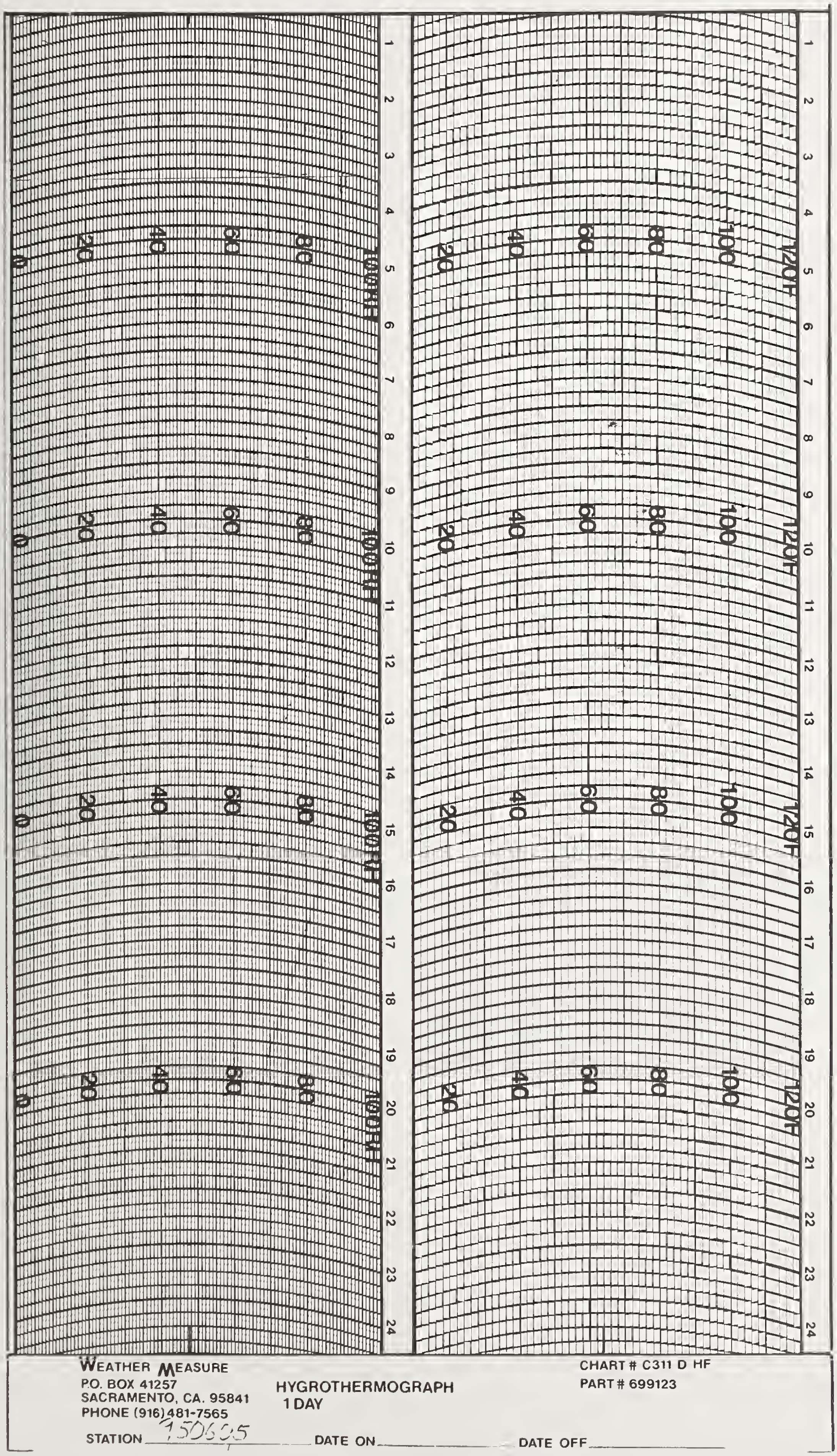
All Dummy, Barrier, And Vehicle Channels:

+X: Forward

+Y: Leftward

+Z: Upward

+Force: Tension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WEATHER MEASURE
P.O. BOX 41257
SACRAMENTO, CA. 95841
PHONE (916) 481-7565

HYGROTHERMOGRAPH
1 DAY

CHART # C311 D HF
PART # 699123

STATION 150605 DATE ON ______ DATE OFF ______

Occupant Compartment Thermograph

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